SANbox 5802V Fibre Channel Switch

Command Line Interface Guide

Firmware Version 7.4

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1 Introduction

This guide describes the features and use of the command line interface for SANbox 5802V switches running firmware version 7.4. This guide is organized as follows:

- Section 1 describes switch models and features, the intended audience, related materials, new items in this release, and technical support.
- Section 2 describes logging on and off of a switch, opening and closing an Admin session, entering commands, getting help, paging a switch, setting page breaks, and loading and retrieving files.
- Section 3 describes the management of user accounts and passwords.
- Section 4 describes configuring the switch network configuration.
- Section 5 describes managing the switch configuration, setting the date and time, backing up and restoring the switch configuration, resetting the switch, installing firmware, and installing feature licenses.
- Section 6 describes port configurations, resetting a port, initializing a port loop, configuring port threshold alarms, and testing ports.
- Section 7 describes managing the zoning database and configuring interoperability.
- Section 8 describes managing connection security.
- Section 9 describes managing device security.
- Section 10 describes managing the Remote Authentication Dial-In User Service (RADIUS) server.
- Section 11 describes events and event logging.
- Section 12 describes managing Call Home email notification.
- Section 13 describes managing the Simple Network Management Protocol (SNMP) configuration.
- Section 14 lists the commands in alphabetical order, including the command syntax, keywords, notes, and examples.

An index is also provided.

Intended Audience

This guide is intended for individuals who are responsible for installing and servicing Fibre Channel equipment using the command line interface.

Related Materials

The following manuals and materials are referenced in the text and/or provide additional information.

- *SANbox 5802V Fibre Channel Switch Installation Guide,* 59265-01
- *SANbox 5802V QuickTools Switch Management User Guide*, 59264-01
- *SANbox 5802V Enterprise Fabric Suite 2007 User Guide,* 59266-00
- *QLogic Fibre Channel Switch Event Message Guide*, publication number 59060-05
- *SANbox Simple Network Management Protocol Reference Guide*, publication number, 59047-09
- *CIM Agent Reference Guide,* 59223-03
- *QLogic Switch Interoperability Guide*. This PDF document can be downloaded at http://www.qlogic.com/interoperability/interoperability.aspx.
- Fibre Channel-Arbitrated Loop (FC-AL-2) Rev. 7.0.
- Fibre Channel-10-bit Interface Rev. 2.3.
- Definitions of Managed Objects for the Fabric Element in Fibre Channel Standard (draft-ietf-ipfc-fabric-element-mib-04.txt).

The Fibre Channel Standards are available from:

Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5776 Phone: (800) 854-7179 or (303) 397-7956
Fax: (303) 397-2740.

Technical Support

Customers should contact their authorized maintenance provider for technical support of their QLogic switch products. QLogic-direct customers may contact QLogic Technical Support; others will be redirected to their authorized maintenance provider.

Visit the QLogic support Web site listed in Contact Information for the latest firmware and software updates.

Availability

QLogic Technical Support for products under warranty is available during local standard working hours excluding QLogic Observed Holidays.

Training

QLogic offers certification training for the technical professional for both the SANblade™ HBAs and the SANbox switches. From the training link at www.qlogic.com, you may choose Electronic-Based Training or schedule an intensive "hands-on" Certification course.

Technical Certification courses include installation, maintenance and troubleshooting QLogic SAN products. Upon demonstrating knowledge using live equipment, QLogic awards a certificate identifying the student as a Certified Professional. The training professionals at QLogic may be reached by email at tech.training@qlogic.com.

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2 Command Line Interface Usage

This section describes the following tasks:

- Logging In to the Switch
- Opening and Closing an Admin Session
- Entering Commands
- Getting Help
- Setting Page Breaks
- Creating a Support File
- Downloading and Uploading Files

NOTE:

Throughout this document, references in text to commands and keywords use initial capitalization for clarity. Actual command and keyword entries are case insensitive

Logging In to the Switch

To log in to a switch through Telnet, do the following:

1. Open a command line window on the workstation and enter the Telnet command followed by the switch IP address. The IP address can be one of the following:

   - 4-byte IP version 4 address
   - 16-byte IP version 6 address
   - Domain Name System (DNS) host name (requires a DNS server)

   The Telnet window opens prompting you for a login.

   ```
   # telnet ip_address
   ```

2. Enter an account name and password. The default account name is *admin*, and its password is *password*.

   ```
   switch login:admin
   password: xxxxxxxx
   ```

   The following warning appears when you log in for the first time:

   ```
   Warning:  Your user account password has not been changed
             It is strongly recommended that you do so before
             proceeding
   ```

To log off, enter the Exit command:

```
SANbox #> exit
```

To log in to a switch through the serial port, do the following:

1. Configure the workstation port with the following settings:

- 9600 baud
- 8-bit character
- 1 stop bit
- No parity

2. Enter an account name and password when prompted. The default account name is *admin*, and its password is *password*.

NOTE:

A switch supports a combined maximum of 19 logins or sessions, which are reserved as follows. Additional logins will be refused.

- 4 logins or sessions for internal applications such as management server and SNMP
- 9 high priority Telnet sessions
- 6 logins or sessions for Enterprise Fabric Suite 2007, QuickTools, Application Programming Interface (API) , and Telnet.

Opening and Closing an Admin Session

The command line interface performs monitoring and configuration tasks. Commands that perform monitoring tasks are available to all user accounts. Commands that perform configuration tasks are available only after entering the Admin Start command to open an Admin session. A user account must have Admin authority to enter the Admin Start command.

The following is an example of how to open and close an Admin session:

```
SANbox #> admin start
SANbox (admin) #>
.
.
.
SANbox (admin) #> admin end
```

Entering Commands

The command-line completion feature makes entering and repeating commands easier. Table 2-1 describes the command-line completion keystrokes.

Table 2-1. Command-Line Completion

Keystroke	Effect
Tab	Completes the command line. Enter at least one character and press the tab key to complete the command line. If more than one possibility exists, press the Tab key again to display all possibilities.
Up Arrow	Scrolls backward through the list of previously entered commands.
Down Arrow	Scrolls forward through the list of previously entered commands.
Control-A	Moves the cursor to the beginning of the command line
Control-E	Moves the cursor to the end of the command line.
Control-U	Clears the command line.

Getting Help

To display help for a command, enter the Help command followed by the command you are inquiring about. The following is an example of the help that is available for the Config Edit command.

```
SANbox #> help config edit
config edit [CONFIG_NAME]
This command initiates a configuration session and places the current session
into config edit mode.
If CONFIG_NAME is given and it exists, it gets edited; otherwise, it gets
created.  If it is not given, the currently active configuration is edited.

Admin mode is required for this command.

  Usage: config edit [CONFIG_NAME]
```

Setting Page Breaks

Some display commands deliver so much information to the screen that it scrolls by too quickly to read it. You can limit the display to 20 lines by turning on page breaks. By default, page breaks are turned off.The following is an example of how to turn page breaks on and how it affects the display.

```
SANbox #> set pagebreak on
SANbox #> zone list

  Zone        ZoneSet
  ----        -------
  Zone1
              alpha
              beta

  Zone2
              delta
              echo

  Zone3
              sierra
              tango

  Zone4
              gamma
              delta

         Press any key to continue, 'q' to quit ...
```

Creating a Support File

If you contact technical support about a problem with your switch, they may request that you create and send a support file. This support file contains all of the switch configuration information, which can be helpful in diagnosing the problem. The Create Support command creates the support file (dump_support.tgz) on the switch. If your workstation has an FTP server, you can proceed with the command prompts to send the file from the switch to a remote host. Otherwise, you can use FTP to download the support file from the switch to your workstation.

NOTE:

Support files are deleted from the switch during a power cycle or switch reset.

The following example creates a support file and sends it to a remote host if your workstation has an FTP server.

```
SANbox #> create support
Log Msg:[Creating the support file - this will take several seconds]

FTP the dump support file to another machine? (y/n): y
Enter IPv4, IPv6 Address or hostname of remote computer: 10.20.33.130
Login name: johndoe
Enter remote directory name: bin/support
Would you like to continue downloading support file? (y/n) [n]: y
Connected to 10.20.33.130 (10.20.33.130).
220 localhost.localdomain FTP server (Version wu-2.6.1-18) ready.
331 Password required for johndoe.
Password:  xxxxxxx

230 User johndoe logged in.
cd bin/support
250 CWD command successful.
lcd /itasca/conf/images
Local directory now /itasca/conf/images
bin
200 Type set to I.
put dump_support.tgz
local: dump_support.tgz remote: dump_support.tgz
227 Entering Passive Mode (10,20,33,130,232,133)
150 Opening BINARY mode data connection for dump_support.tgz.
226 Transfer complete.
43430 bytes sent in 0.292 secs (1.5e+02 Kbytes/sec)
Remote system type is UNIX.
Using binary mode to transfer files.
221-You have transferred 43430 bytes in 1 files.
221-Total traffic for this session was 43888 bytes in 1 transfers.
221 Thank you for using the FTP service on localhost.localdomain.
```

If your workstation does not have an FTP server, enter the Create Support command to create the support file, and then use FTP to download the support file from the switch to your workstation, as shown in the following example:

```
SANbox #> create support
Log Msg:[Creating the support file - this will take several seconds]
FTP the dump support file to another machine? (y/n): n
```

To download the support file from the switch to the workstation, do the following:

1. Open a terminal window and move to the directory where you want to download the support file.
2. Enter the FTP command and the switch IP address or symbolic name.

   ```
   >ftp 10.0.0.1
   ```
3. When prompted for a user and password, enter the FTP account name and password (images, images).

   ```
   user: images
   password: images
   ```
4. Set binary mode and use the Get command to download the file (dump_support.tgz).

   ```
   ftp>bin
   ftp>get dump_support.tgz
       xxxxx bytes sent in xx secs.
   ftp>quit
   ```

Downloading and Uploading Files

Several files that reside on the switch can be downloaded to the workstation for examination or for safekeeping. These files include the following:

- Backup configuration file (configdata)
- Log files (logfile)
- Support files (dump_support.tgz)

You can upload firmware image files or backup configuration files to the switch to reinstall firmware or restore a corrupted configuration. The switch uses FTP to exchange files between the switch and the workstation.

To download a file from the switch to the workstation, do the following:

1. Enter the FTP command and the switch IP address or symbolic name.

   ```
   >ftp 10.0.0.1
   ```
2. When prompted for a user and password, enter the FTP account name and password (images, images).

   ```
   user: images
   password: images
   ```

3. Set binary mode and use the Get command to download the file (configdata).

```
ftp>bin
ftp>get configdata
    xxxxx bytes sent in xx secs.
ftp>quit
```

To upload a file from the workstation to the switch, do the following

1. Enter the FTP command and the switch IP address or symbolic name.

```
>ftp 10.0.0.1
```

2. When prompted for a user and password, enter the FTP account name and password (images, images).

```
user:images
password: images
```

3. Set binary mode and use the Put command to upload the file (config_switch_169).

```
ftp>put config_switch_169 configdata
    xxxxx bytes sent in xx secs.
ftp>quit
```

For more information about reinstallation, backup and restore, and creating support and log files:

- Refer to “Installing Firmware” on page 5-20 for information about installing firmware.
- Refer to “Backing Up and Restoring a Switch Configuration” on page 5-14 for information about backing up and restoring a switch configuration.
- Refer to “Creating and Downloading a Log File” on page 11-7 for information about creating a log file.
- Refer to “Creating a Support File” on page 2-6 for information about creating a support file.

3 User Account Configuration

User accounts and their respective passwords are the first line of switch security. A user account consists of an account name, an authority level, and an expiration date. Switches come from the factory with certain user accounts defined for special purposes. Table 3-1 describes these accounts, their passwords, and their purposes. These accounts cannot be deleted from the switch.

Table 3-1. Factory User Accounts

User Account Name	Password	Purpose
admin	password	Provides access to the Telnet server for managing the switch. Admin is the only account name that has permission to create and modify other user accounts. To secure your admin user account, be sure to change the password for this account.
images	images	Provides access to the File Transfer Protocol (FTP) server for exchanging files between the switch and the workstation.
prom	prom	Provides access to the Maintenance mode menu to perform switch recovery tasks. Refer to the *SANbox 5802V Fibre Channel Switch Installation Guide* for information about using Maintenance mode.

This section describes the following user account configuration tasks:

- Displaying User Account Information
- Creating User Accounts
- Modifying User Accounts and Passwords

Displaying User Account Information

You can display all user accounts defined on the switch (User Accounts command) or just those user accounts that are logged on (User List or Show Users commands).

The following example displays all user accounts defined on the switch. Account information includes account name, authority, and expiration date.

```
SANbox (admin) #> user accounts

    Current list of user accounts
  ----------------------------
  images       (admin authority = False, never expires)
  admin        (admin authority = True , never expires)
  chuckca      (admin authority = False, expires in < 50 days)
  gregj        (admin authority = True , expires in < 100 days)
  fred         (admin authority = True , never expires)
```

The following example displays user accounts that are logged on to the switch:

```
SANbox (admin) #> user list

  User             cim@OB-session1
  Client           cim
  Logged in Since  day month date time year

  User             snmp@IB-session2
  Client           Unknown
  Logged in Since  day month date time year

  User             snmp@OB-session3
  Client           Unknown
  Logged in Since  day month date time year

  User             admin@OB-session8
  Client           10.33.21.27
  Logged in Since  day month date time year
```

Creating User Accounts

A user account consists of an account name, an authority level, and an expiration date. The account name can be up to 15 characters: the first character must be alphanumeric; the remaining characters must be ASCII characters except semicolor (;), comma (,), #, and period (.). The authority level grants admin authority (true) or denies it (false). The expiration date sets the date when the user account expires. Only the Admin user account can create user accounts. You add user accounts with the User Add command.

The following example creates a new user account named user1 with admin authority that expires in 100 days.

```
SANbox (admin) #> user add
Press 'q' and the ENTER key to abort this command.
account name (1-15 chars)      : user1
account password (8-20 chars)  : *******

please confirm account password: *******

set account expiration in days (0-2000, 0=never): [0] 100

should this account have admin authority? (y/n): [n] y

OK to add user account 'user1' with admin authority
and to expire in 100 days?

Please confirm (y/n): [n] y
```

Modifying User Accounts and Passwords

Only the Admin user account can modify a user account, delete a user account, or change the password of another user account. However, all user accounts can change their own passwords. The User command modifies and deletes user accounts. The Passwd command changes passwords.

The following example removes the expiration date and admin authority for the user account named user1.

```
SANbox (admin) #> user edit

      Press 'q' and the ENTER key to abort this command.

  account name (1-15 chars)      : user1
  set account expiration in days (0-2000, 0=never): [0]
  should this account have admin authority? (y/n): [n]

  OK to modify user account 'user1' with no admin authority
  and to expire in 0 days?

  Please confirm (y/n): [n]
```

The following example deletes the user account named user3.

```
SANbox (admin) #> user delete user3

  The user account will be deleted.  Please confirm (y/n): [n] y
```

In the following example, the Admin user account changes the password for the user account named user2.

```
SANbox #> admin start
SANbox (admin) #> passwd user2

      Press 'q' and the ENTER key to abort this command.

  account OLD password               : ********
  account NEW password (8-20 chars)  : ********

  please confirm account NEW password: ********
  password has been changed.
```

4 Network Configuration

Network configuration consists of the IP parameters that identify the switch in the network and provide for IP security. This section describes the following network configuration tasks:

- Displaying the Network Configuration
- Configuring the Ethernet Port
- Verifying a Switch in the Network
- Managing IP Security

Displaying the Network Configuration

The Show Fabric command displays IP addresses for all switches in the fabric as shown in the following example.

```
SANbox #> show fabric
  Domain           *133(0x85)
  WWN              10:00:00:c0:dd:0d:53:91
  SymbolicName     SANbox
  HostName         <undefined>
  EthIPv4Address   10.20.116.133
  EthIPv6Address   <undefined>

  * indicates principal switch
```

The Show Setup System command displays the entire switch network configuration, which includes the following:

- IP configurations (versions 4 and 6)
- DNS server configuration

To display specific information, add the corresponding keyword. For example, to display IP version 6 configuration information, enter the Show Setup System Ipv6 command:

```
SANbox #> show setup system ipv6

  System Information
  ------------------
  EthIPv6NetworkEnable         False
  EthIPv6NetworkDiscovery      Static
  EthIPv6NetworkAddress        2001::1/64
  EthIPv6GatewayAddress        fe80::1
```

Configuring the Ethernet Port

Use the Set Setup System command in an Admin session to configure the Ethernet port and other network parameters. You can configure all of the following parameters in one session, or you can configure specific parameters by adding the corresponding keyword:

- IP Version 4 Configuration
- IP Version 6 Configuration
- DNS Server Configuration

IP Version 4 Configuration

The switch supports IP version 4, which includes the following:

- Network discovery method
- IP address
- Subnet mask
- IP gateway address

The network discovery method determines how the switch acquires its IP address. The IP address can come from the IP address that resides on the switch or from a server. The switch supports network discovery from the following server types:

- Bootstrap Protocol (BootP)
- Reverse Address Resolution Protocol (RARP)
- Dynamic Host Configuration Protocol (DHCP)

To configure the IP version 4 parameters, enter the Set Setup System Ipv4 command:

```
SANbox (admin) #> set setup system ipv4

A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    EthIPv4NetworkEnable    True
    EthIPv4NetworkDiscovery Static
    EthIPv4NetworkAddress   10.20.116.133
    EthIPv4NetworkMask      255.255.255.0
    EthIPv4GatewayAddress   10.20.116.1

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    EthIPv4NetworkEnable    (True / False)                      :
    EthIPv4NetworkDiscovery (1=Static, 2=Bootp, 3=Dhcp, 4=Rarp) :
    EthIPv4NetworkAddress   (dot-notated IP Address)            : 10:20:30:40
    EthIPv4NetworkMask      (dot-notated IP Address)            : 255.0.0.0
    EthIPv4GatewayAddress   (dot-notated IPv4 Address)          : 10.20.30.254

  Do you want to save and activate this system setup? (y/n): [n] y
```

IP Version 6 Configuration

The switch supports IP version 6, which includes the following:

- Network discovery method
- IP address
- IP gateway address

The network discovery method determines how the switch acquires its IP address. The IP address can come from the IP address (static) that resides on the switch, from a DHCP server, or it can be learned from a router through the Neighbor Discovery Protocol (NDP). To configure the IP version 6 parameters, enter the Set Setup System Ipv6 command:

```
SANbox (admin) #> set setup system ipv6

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    EthIPv6NetworkEnable    False
    EthIPv6Discovery        Static
    EthIPv6NetworkAddress   <undefined>
    EthIPv6GatewayAddress   <undefined>

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    EthIPv6NetworkEnable    (True / False)                    :
    EthIPv6Discovery        (1=Static, 2=Dhcpv6, 3=Ndp)       :
    EthIPv6NetworkAddress   (IPv6 Address/Mask Length format) :
    EthIPv6GatewayAddress   (IPv6 Address)                    :

  Do you want to save and activate this system setup? (y/n): [n]
```

DNS Server Configuration

A DNS server manages the host names for a fabric. This enables you to specify servers and switches by a meaningful name rather than IP address. To configure a DNS server, enter the Set Setup System Dns command in an Admin session as shown in the following example:

```
SANbox (admin) #> set setup system dns

A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    DNSClientEnabled        False
    DNSLocalHostname        <undefined>
    DNSServerDiscovery      Static
    DNSServer1Address       <undefined>
    DNSServer2Address       <undefined>
    DNSServer3Address       <undefined>
    DNSSearchListDiscovery  Static
    DNSSearchList1          <undefined>
    DNSSearchList2          <undefined>
    DNSSearchList3          <undefined>
    DNSSearchList4          <undefined>
    DNSSearchList5          <undefined>

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    DNSClientEnabled        (True / False)               :
    DNSLocalHostname        (hostname)                   :
    DNSServerDiscovery      (1=Static, 2=Dhcp, 3=Dhcpv6) :
    DNSServer1Address       (IPv4, or IPv6 Address)      :
    DNSServer2Address       (IPv4, or IPv6 Address)      :
    DNSServer3Address       (IPv4, or IPv6 Address)      :
    DNSSearchListDiscovery  (1=Static, 2=Dhcp, 3=Dhcpv6) :
    DNSSearchList1          (domain name)                :
    DNSSearchList2          (domain name)                :
    DNSSearchList3          (domain name)                :
    DNSSearchList4          (domain name)                :
    DNSSearchList5          (domain name)                :

  Do you want to save and activate this system setup? (y/n): [n]
```

Verifying a Switch in the Network

You can verify that a switch is communicating in the network using the Ping command. The following example successfully tests the network for a switch with IP address 10.20.11.57.

```
SANbox #> ping 10.20.11.57
  Ping command issued. Waiting for response...
SANbox #>
  Response successfully received from 10.20.11.57.
```

If the switch was unreachable, you would see the following display.

```
SANbox #> ping 10.20.11.57
  Ping command issued. Waiting for response...
  No response from 10.20.11.57. Unreachable.
```

Managing IP Security

To modify IP Security, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time through Telnet, QuickTools, Enterprise Fabric Suite 2007, or another management application. You must also open an Ipsec Edit session with the Ipsec Edit command. The Ipsec Edit session provides access to the Ipsec, Ipsec Association and Ipsec Policy commands with which you make modifications to the IP Security configuration.

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec)#> ipsec . . .
SANbox (admin-ipsec)#> ipsec policy . . .
SANbox (admin-ipsec)#> ipsec association. . .
```

When you are finished making changes, enter the Ipsec Save command to save and activate the changes and close the Ipsec Edit session. Changes take effect immediately.

```
SANbox (admin-ipsec)#> ipsec save
```

To close the Ipsec Edit session without saving changes, enter the Ipsec Cancel command.

```
SANbox (admin-ipsec)#> ipsec cancel
```

The Admin End command releases the Admin session for other administrators when you are done making changes to the switch.

To remove all IP security policies and associations, enter the Reset Ipsec command.

```
SANbox (admin) #> reset ipsec
```

The following subsections present IP security concepts and management tasks:

- IP Security Concepts
- Displaying IP Security Information
- Managing the Security Policy Database
- Managing the Security Association Database
- Resetting the IP Security Configuration

IP Security Concepts

IP Security provides encryption-based security for IP version 4 and IP version 6 communications through the use of security policies and associations. The security policy database is the set of all security policies configured on the switch. A security policy defines the following parameters:

- Connection source and destination
- Data traffic direction: inbound or outbound
- Protocols for which to protect data traffic
- Security protocols; Authentication Header (AH) or Encapsulating Security Payload (ESP)
- Level of protection: IP Security, discard, or none

Policies can define security for host-to-host, host-to-gateway, and gateway-to-gateway connections; one policy for each direction. For example, to secure the connection between two hosts, you need two policies: one for outbound traffic from the source to the destination, and another for inbound traffic to the source from the destination. You can specify sources and destinations by IP addresses (version 4 or 6) or DNS host names. If a host name resolves to more than one IP address, the switch creates the necessary policies and associations. You can recognize these dynamic policies and associations because their names begin with *DynamicSP_* and *DynamicSA_* respectively.

You can apply IP security to all communication between two systems, or to select protocols, such as ICMP, TCP, or UDP. Furthermore, instead of applying IP security, you can choose to discard all inbound or outbound traffic, or allow all traffic without encryption. Both the AH and ESP security protocols provide source authentication, ensure data integrity, and protect against replay.

A security association defines the encryption algorithm and encryption key to apply when called by a security policy. A security policy may call several associations at different times, but each association is related to only one policy. The security association database is the set of all security associations.

IP Security configurations can be complex: it is possible to unintentionally configure policies and associations that isolate a switch from all communication. If this happens, you can disable IP Security by placing the switch in maintenance mode, and correct the problem through the serial port interface. Refer to the *SANbox 5802V Fibre Channel Switch Installation Guide* for information about using maintenance mode and connecting through the serial port.

Displaying IP Security Information

You can display the security policy and security association databases in the following ways:

- Active policies and associations; that is, policies and associations currently in use
- Configured policies and associations; that is, policies and associations that have been saved in the database
- Policies and associations that are being edited, but have not been saved

You can display the following types of IP Security configuration information:

- Policy and Association Information
- IP Security Configuration History
- IP Security Configuration Limits

Policy and Association Information

To display general or specific policy and association information, enter the Ipsec List command. The Ipsec List command does not require an Admin session nor an Ipsec Edit session. Within an Ipsec Edit session, the Ipsec Association List and Ipsec Policy List commands display the same information.

The following example displays all active policies and associations:

```
SANbox #> ipsec list

  Active IPsec Information

  Security Association Database
  -----------------------------
  h2h-sh-sa
  h2h-hs-sa

  Security Policy Database
  ------------------------
  h2h-hs-sp
  h2h-sh-sp

  Summary
  -------
    Security Association Count:   2
    Security Policy Count:        2
```

IP Security Configuration History

To display the IP Security configuration history, enter the Ipsec History command to display a record of policy and association modifications as shown in the following example:

```
SANbox #> ipsec history

  IPsec Database History
  ----------------------
  ConfigurationLastEditedBy      johndoe@OB-session5
  ConfigurationLastEditedOn      Sat Mar  8 07:14:36 2008
  Active Database Checksum       00000144
  Inactive Database Checksum     00000385
```

History information includes the following:

- Time of the most recent activation and the user account that performed it
- Time of the most recent modification to the IP Security configuration and the user account that made it
- Checksum for the active and inactive databases

IP Security Configuration Limits

To display a summary of the objects in the IP Security configuration and their maximum limit, enter the Ipsec Limits command to as shown in the following example:

```
SANbox #> ipsec limits

  Configured (saved) IPsec Information

  IPsec Attribute            Maximum  Current
  ---------------            -------  -------
  MaxConfiguredSAs               512        0
  MaxConfiguredSPs               128        0
```

In an Ipsec Edit session, Ipsec Limits command displays the number of both configured associations and policies, plus those created in the edit session but not yet saved.

Managing the Security Policy Database

The security policy database is made up of user-defined policies and dynamic policies (policies created by the switch). In addition to creating a policy, you can delete, modify, rename, and copy user-defined policies. Dynamic policies can only be copied.

- Creating a Policy
- Deleting a Policy
- Modifying a User-Defined Policy
- Renaming a User-Defined Policy
- Copying a Policy

Creating a Policy

To create a policy, enter the Ipsec Policy Create command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec policy create h2h-sh-sp

  A list of attributes with formatting will follow.
  Enter a value or simply press the ENTER key to skip specifying a value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Required attributes are preceded by an asterisk.

  Value (press ENTER to not specify value, 'q' to quit):
    Description       (string value, 0-127 bytes)                    :  Host-to-host: switch->host
   *SourceAddress     (hostname, IPv4, or IPv6 Address/[PrefixLength]):  fe80::2c0:ddff:fe03:d4c1
    SourcePort        (decimal value, 1-65535)                       :
   *DestinationAddress (hostname, IPv4, or IPv6 Address/[PrefixLength]):  fe80::250:daff:feb7:9d02
    DestinationPort   (decimal value, 1-65535)                       :
   *Protocol          (decimal value, or keyword)
                        Allowed keywords
                          icmp, icmp6, ip4, tcp, udp or any          :  any
   *Direction         (1=in, 2=out)                                  :  2
    Priority          (value, -2147483647 to +214783647)             :
   *Action            (1=discard, 2=none, 3=ipsec)                   :  3
   *ProtectionDesired  (select one, transport-mode only)
                        1=ah   Authentication Header
                        2=esp  Encapsulating Security Payload
                        3=both                                       :  2
   *espRuleLevel      (1=default, 2=use, 3=require)                  :  3

  The security policy has been created.
  This configuration must be saved with the 'ipsec save' command
  before it can take effect, or to discard this configuration
  use the 'ipsec cancel' command.
```

Deleting a Policy

To delete a user-defined policy, enter the Ipsec Policy Delete command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec policy delete policy_1

  The security policy will be deleted. Please confirm (y/n): [n] y

SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Modifying a User-Defined Policy

To modify an existing user-defined policy, enter the Ipsec Policy Edit command in an Admin session and an Ipsec Edit session as shown in the following example. An asterisk (*) indicates a required entry.

```
SANbox (admin-ipsec) #> ipsec policy edit h2h-sh-sp

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  To remove a value for an optional attribute, use ’n’.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    Description             Host-to-host: switch->host
      .
      .
      .
    espRuleLevel            require

  New Value (press ENTER to not specify value, 'q' to quit, 'n' for none):
    Description (string value, 0-127 bytes)                    :
   *SourceAddress (IPv4, IPv6 or hostname/[PrefixLength])      :
    SourcePort (decimal value, 1-65535)                        :
   *DestinationAddress (IPv4, IPv6 or hostname/[PrefixLength]) :
    DestinationPort (decimal value, 1-65535)                   :
   *Protocol (decimal value, or keyword)
      Allowed keywords
         icmp, icmp6, ip4, tcp, udp or any                     : tcp
   *Direction (1=in, 2=out)                                    :
    Priority (value, -2147483647 to +2147483647)               :
   *Action (1=discard, 2=none, 3=ipsec)                        :
   *ProtectionDesired (select one, transport-mode only)
      1=ah Authentication Header
      2=esp Encapsulating Security Payload
      3=both :
   *ahRuleLevel (1=default, 2=use, 3=require)                  :
   *espRuleLevel (1=default, 2=use, 3=require)                 :

  The security policy has been edited.
  This configuration must be saved with the 'ipsec save' command
  before it can take effect, or to discard this configuration
  use the 'ipsec cancel' command.

SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Renaming a User-Defined Policy

To rename a policy (policy_1), enter the Ipsec Policy Rename command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec policy rename policy_1 policy_4

  The security policy will be renamed. Please confirm (y/n): [n] y

SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Copying a Policy

You can copy both user-defined and dynamic policies. To copy a policy (policy_1), enter the Ipsec Policy Copy command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec policy copy policy_1 policy_a
SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Managing the Security Association Database

The security association database is made up of user-defined associations and dynamic associations (associations created by the switch). In addition to creating an association, you can delete, modify, rename, and copy user-defined associations. Dynamic associations can only be copied.

- Creating an Association
- Deleting an Association
- Modifying a User-Defined Association
- Renaming a User-Defined Association
- Copying an Association

Creating an Association

To create an association, enter the Ipsec Association Create command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec association create h2h-sh-sa

  A list of attributes with formatting will follow.
  Enter a value or simply press the ENTER key to skip specifying a value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Required attributes are preceded by an asterisk.

  Value (press ENTER to not specify value, 'q' to quit):
    Description        (string value, 0-127 bytes)           :  Host-to-host: switch->host
   *SourceAddress      (hostname, IPv4, or IPv6 Address)     :  fe80::2c0:ddff:fe03:d4c1
   *DestinationAddress (hostname, IPv4, or IPv6 Address)     :  fe80::250:daff:feb7:9d02
   *Protocol           (1=esp, 2=esp-old, 3=ah, 4=ah-old)    :  1
   *SPI                (decimal value, 256-4294967295)       :  333
    Authentication     (select an authentication algorithm)
                          1=hmac-md5       (16 byte key)
                          2=hmac-sha1      (20 byte key)
                          3=hmac-sha256    (32 byte key)
                          4=aes-xcbc-mac   (16 byte key)
                       authentication algorithm choice       :  2
   *AuthenticationKey  (quoted string or raw hex bytes)      :  "12345678901234567890"
   *Encryption         (select an encryption algorithm)
                          1=des-cbc        (8 byte key)
                          2=3des-cbc       (24 byte key)
                          3=null           (0 byte key)
                          4=blowfish-cbc   (5-56 byte key)
                          5=aes-cbc        (16/24/32 byte key)
                          6=twofish-cbc    (16-32 byte key)
                       encryption algorithm choice           :  2
   *EncryptionKey      (quoted string or raw hex bytes)      :  "123456789012345678901234"

  The security association has been created.
  This configuration must be saved with the 'ipsec save' command
  before it can take effect, or to discard this configuration
  use the 'ipsec cancel' command.
```

Deleting an Association

To delete a user-defined association, enter the Ipsec Association Delete command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec association delete association_1

  The security association will be deleted. Please confirm (y/n): [n] y

SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Modifying a User-Defined Association

To modify an existing user-defined association, enter the Ipsec Association Edit command in an Admin session and an Ipsec Edit session as shown in the following example. An asterisk (*) indicates a required entry.

```
SANbox (admin-ipsec) #> ipsec association edit h2h-sh-sa
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  To remove a value for an optional attribute, use ’n’.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
     Description         Host-to-host: switch->host
     .
     .
     EncryptionKey       12345678901234567890123 4

  New Value (press ENTER to not specify value, 'q' to quit, 'n' for none):
     Description         (string value, 0-127 bytes)         :
    *SourceAddress       (IPv4, IPv6 or hostname)            :
    *DestinationAddress  (IPv4, IPv6 or hostname)            :
    *Protocol            (1=esp, 2=esp-old, 3=ah, 4=ah-old)  : ah
    *SPI                 (decimal value, 256-4294967295)     :
     Authentication      (select an authentication algorithm)
                            1=hmac-md5       (16 byte key)
                            2=hmac-sha1      (20 byte key)
                            3=hmac-sha256    (32 byte key)
                            4=aes-xcbc-mac   (16 byte key)
                         authentication algorithm choice     :
    *AuthenticationKey   (quotes string or raw hex bytes)    :
    *Encryption          (select an encryption algorithm)
                            1=des-cbc (8 byte key)
                            2=3des-cbc (24 byte key)
                            3=null (0 byte key)
                            4=blowfish-cbc (5-56 byte key)
                            5=aes-cbc (16/24/32 byte key)
                            6=twofish-cbc (32 byte key)
                          encryption algorithm choice        :
    *EncryptionKey        (quoted string or raw hex bytes)   :

The security association has been edited.
This configuration must be saved with the 'ipsec save' command
before it can take effect, or to discard this configuration
use the 'ipsec cancel' command.

SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Renaming a User-Defined Association

To rename a user-defined association (associaton_1), enter the Ipsec Association Rename command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec association rename association_1 association_4

  The security association will be renamed. Please confirm (y/n): [n] y

SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Copying an Association

You can copy both user-defined and dynamic associations. To copy an association (association_1), enter the Ipsec Association Copy command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec association copy association_1 association_a
SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

Resetting the IP Security Configuration

Resetting the IP Security configuration deletes all policies and associations from the switch. There are two ways to do this. Within an Ipsec Edit session, enter the Ipsec Clear command, then save the changes as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec clear
SANbox (admin-ipsec) #> ipsec save
  The IPsec configuration will be saved and activated.
  Please confirm (y/n): [n] y
```

The Reset Ipsec command deletes all polices and associations from the switch, but does not require an Ipsec Edit session.

```
SANbox #> admin start
SANbox (admin) #> reset ipsec

The IPsec configuration will be reset and the default values activated.
Please confirm (y/n): [n] y

Reset and activation in progress ....
```

Notes

5 Switch Configuration

Switch configuration consists of the following tasks:

- Displaying Switch Information
- Managing Switch Services
- Managing Switch Configurations
- Paging a Switch
- Setting the Date and Time
- Resetting a Switch
- Installing Firmware
- Testing a Switch
- Verifying and Tracing Fibre Channel Connections
- Managing Switch Feature Upgrades
- Managing Idle Session Timers

Displaying Switch Information

You can display the following types of the switch information:

- Name Server Information
- Switch Operational Information
- System Process Information
- Elapsed Time Between Resets
- Configuration Information
- Hardware Information
- Firmware Information

Name Server Information

The Show Ns command displays the list of WWNs in fabric as shown in the following example:

```
SANbox #> show ns all
 Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  No entries found for domain ID 1.

  Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  No entries found for domain ID 4.

  Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  1   8 (0x8)   0824ba NL   3   22:00:00:20:37:2b:08:00 20:00:00:20:37:2b:08:00
  2   8 (0x8)   0824c3 NL   3   22:00:00:20:37:2b:08:78 20:00:00:20:37:2b:08:78
  3   8 (0x8)   0824c5 NL   3   22:00:00:20:37:1b:cf:fd 20:00:00:20:37:1b:cf:fd
  4   8 (0x8)   0824c6 NL   3   22:00:00:20:37:2b:07:b4 20:00:00:20:37:2b:07:b4
  5   8 (0x8)   0824c9 NL   3   22:00:00:20:37:2b:08:57 20:00:00:20:37:2b:08:57
  6   8 (0x8)   0824cb NL   3   22:00:00:20:37:1b:cf:f6 20:00:00:20:37:1b:cf:f6
  7   8 (0x8)   0824cc NL   3   22:00:00:20:37:2b:0b:ec 20:00:00:20:37:2b:0b:ec
  8   8 (0x8)   0824d6 NL   3   22:00:00:20:37:2b:07:e1 20:00:00:20:37:2b:07:e1
  9   8 (0x8)   0824da NL   3   22:00:00:20:37:2b:0b:1a 20:00:00:20:37:2b:0b:1a
  10  8 (0x8)   0824e0 NL   3   22:00:00:20:37:1b:f0:7d 20:00:00:20:37:1b:f0:7d
  11  8 (0x8)   0824e1 NL   3   22:00:00:20:37:2b:02:f6 20:00:00:20:37:2b:02:f6
  12  8 (0x8)   0824e2 NL   3   22:00:00:20:37:1b:ea:b7 20:00:00:20:37:1b:ea:b7
  13  8 (0x8)   0824e8 NL   3   22:00:00:20:37:1b:cb:e5 20:00:00:20:37:1b:cb:e5

  Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  No entries found for domain ID 10.

  Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  No entries found for domain ID 34.
```

Switch Operational Information

The Show Switch command displays a variety of switch operational information. These include the switch WWN, domain ID, firmware version, administrative state, and operational state as shown in the following example:

```
SANbox #> show switch
  Switch Information
  ------------------
  SymbolicName                    SANbox
  SwitchWWN                       10:00:00:c0:dd:00:bc:56
  BootVersion                     Vx.x.x.x-0 (day month date time year)
  CreditPool                      0
  DomainID                        19 (0x13)
  FirstPortAddress                130000
  FlashSize - MBytes              128
  LogFilterLevel                  Critical
  MaxPorts                        24
  NumberOfResets                  15
  ReasonForLastReset              PowerUp
  ActiveImageVersion - build date Vx.x.x.0 (day month date time year)
  PendingImageVersion - build date Vx.x.x.0 (day month date time year)
  ActiveConfiguration             default
  AdminState                      Online
  AdminModeActive                 False
  BeaconOnStatus                  Off
  OperationalState                Online
  PrincipalSwitchRole             False
  POSTFaultCode                   00000000
  POSTStatus                      Passed
  TestFaultCode                   00000000
  TestStatus                      NeverRun
  BoardTemp (1) - Degrees Celsius 32
  SwitchTemperatureStatus         Normal
```

System Process Information

The Ps command displays system process information to help you determine what processes are running and CPU usage. The following example displays current system processes.

```
SANbox #> ps
  PID  PPID %CPU %MEM     TIME     ELAPSED COMMAND
  244   224  0.0  0.3 00:00:04  2-03:02:31 cns
  245   224  0.0  0.3 00:00:06  2-03:02:31 ens
  246   224  0.0  0.3 00:00:09  2-03:02:31 dlog
  247   224  0.0  0.6 00:00:33  2-03:02:31 ds
  248   224  0.3  2.8 00:09:59  2-03:02:31 mgmtApp
  249   224  0.0  0.3 00:00:16  2-03:02:31 sys2swlog
  251   224  0.0  0.4 00:00:06  2-03:02:30 fc2
  252   224  0.0  0.6 00:00:16  2-03:02:30 nserver
  253   224  0.0  0.8 00:00:08  2-03:02:30 PortApp
  254   224  0.0  0.5 00:00:03  2-03:02:30 qfsApp
  255   224  0.0  0.5 00:00:09  2-03:02:30 mserver
  256   224  0.0  0.7 00:00:06  2-03:02:30 eport
  257   224  0.0  0.6 00:00:13  2-03:02:30 zoning
  282   254  0.0  0.5 00:00:00  2-03:02:26 qfsApp
  284   224  0.0  0.6 00:00:08  2-03:02:26 snmpservicepath
  285   282  0.0  0.5 00:00:00  2-03:02:26 qfsApp
  308   224  0.0  0.8 00:00:29  2-03:02:25 cim_server
  322   224  0.0  0.7 00:00:16  2-03:02:24 util
  323   224  0.0  0.4 00:00:09  2-03:02:24 port_mon
  324   224  0.0  0.5 00:00:07  2-03:02:24 diagAgent
  325   224  0.0  0.4 00:00:03  2-03:02:24 diagExec
  289   224  0.0  0.4 00:00:00  2-03:02:25 snmpd
  290   224  0.0  0.5 00:00:00  2-03:02:25 snmpmain
  335   290  0.0  0.5 00:00:00  2-03:02:23 snmpmain
  336   335  0.0  0.5 00:00:00  2-03:02:23 snmpmain
```

The column titles are as follows:

- PID–Process identifier
- PPID–Parent process identifier
- %CPU–Percentage CPU usage
- %MEM–Percentage memory usage
- TIME–Actual processing time
- ELAPSED–Elapsed time since the process started
- COMMAND–The command that initiated the process.

Elapsed Time Between Resets

The Uptime command displays the elapsed time since the switch was last reset and the reset method. A hot reset or non-disruptive firmware activation does not reset the elapsed time reported by this command. The following example displays the time since the last reset.

```
SANbox #> uptime
  Elapsed up time  : 0 day(s), 2 hour(s), 28 min(s), 44 sec(s)
  Reason last reset: NormalReset
```

Configuration Information

The Show Config command displays a variety of configuration information at the port and switch levels. In addition to the basic switch configurations, the Show Config command displays parameters that control how data is maintained in the security and zoning databases. The Show Config command displays the following types of information:

- Switch Configuration Parameters
- Zoning Configuration Parameters
- Security Configuration Parameters

Refer to “Displaying Port Information” on page 6-1 for information about displaying port configuration information.

Switch Configuration Parameters

Enter the Show Config Switch command to display the switch configuration parameters. These parameters determine the operational characteristics of the switch. Refer to Table 14-22 for a description these parameters.

```
SANbox #> show config switch
 Configuration Name: default
 -------------------
  Switch Configuration Information
  --------------------------------
  AdminState            Online
  BroadcastEnabled      False
  InbandEnabled         True
  FDMIEnabled           False
  FDMIEntries           10
  DefaultDomainID       19 (0x13)
  DomainIDLock          True
  SymbolicName          sw108
  R_A_TOV               10000
  E_D_TOV               2000
  PrincipalPriority     254
  ConfigDescription     Default Config
  ConfigLastSavedBy     admin@OB-session5
  ConfigLastSavedOn     day month date time year
  InteropMode           Standard
```

Zoning Configuration Parameters

Enter the Show Config Zoning command to display zoning configuration parameters. These parameters determine how zoning is applied to the switch. Refer to Table 14-24 for a description of these parameters.

```
SANbox #> show config zoning

 Configuration Name: default
  -------------------

  Zoning Configuration Information
  --------------------------------
  MergeAutoSave         True
  DefaultZone           Allow
  DiscardInactive       False
```

Security Configuration Parameters

Enter the Show Config Security command to display security configuration and port binding parameters. These parameters determine how security is applied to the switch. Refer to Table 14-20 for a description of the switch security configuration parameters. Refer to Table 14-21 for a description of the port binding parameters.

```
SANbox #> show config security

  Configuration Name: default
  -------------------

  Switch Security Configuration Information
  -----------------------------------------
  FabricBindingEnabled  False
  AutoSave              True

  Port  Binding Status  WWN
  ----  --------------  ---
  0       True          10:20:30:40:50:60:70:80
  1       True          10:20:30:40:50:60:70:80
  2       False         No port binding entries found.
  3       True          10:20:30:40:50:60:70:80
  4       True          10:20:30:40:50:60:70:80
  5       False         No port binding entries found.
  6       True          10:20:30:40:50:60:70:81
  7       False         No port binding entries found.
  8       True          10:20:30:40:50:60:70:80
  9       False         No port binding entries found.
  10      False         No port binding entries found.
  11      False         No port binding entries found.
  12      False         No port binding entries found.
  13      False         No port binding entries found.
  14      False         No port binding entries found.
  15      False         No port binding entries found.
  16      False         No port binding entries found.
  17      False         No port binding entries found.
  18      False         No port binding entries found.
  19      False         No port binding entries found.
  20      False         No port binding entries found.
  21      False         No port binding entries found.
  22      False         No port binding entries found.
  23      False         No port binding entries found.
```

Hardware Information

Enter the Show Chassis command to display the status of the switch hardware including fans, power supplies, internal temperature, and Heartbeat LED status.

```
SANbox #> show chassis
  Chassis Information
  -------------------
  BoardTemp (1) - Degrees Celsius   36
  FanStatus (1)                     Good
  FanStatus (2)                     Good
  FanDirection (1)                  BackToFront
  FanDirection (2)                  BackToFront
  PowerSupplyStatus (1)             Good
  PowerSupplyStatus (2)             Good
  HeartBeatCode                     1
  HeartBeatStatus                   Normal
```

The HeartBeatCode and HeartBeatStatus entries indicate the Power-on Self Test (POST) results revealed by the Heartbeat LED blink patterns. The result is normal operation or a blink pattern indicating a critical error as described in Table 5-1. Refer to the *SANbox 5802V Fibre Channel Switch Installation Guide* for more information about the Heartbeat LED and its blink patterns.

Table 5-1. Heartbeat LED Activity

HeartBeatCode–HeartBeatStatus	Description
1–Normal	One blink per second–Normal operation
2–AppDied	Two blink cluster–Internal firmware failure
3–PostFailed	Three blink cluster–Fatal POST error
4–CorruptFilesystem	Four blink cluster–Configuration file system error
5–Overheating	Five blink cluster– Over temperature

Firmware Information

Enter the Show Version command to display a summary of switch identity information including the firmware version. The following is an example of the Show Version command:

```
SANbox #> show version
       ************************************************
       *                                              *
       *       Command Line Interface SHell  (CLISH)  *
       *                                              *
       ************************************************

       SystemDescription         SANbox 5802V FC Switch
       HostName                  <undefined>
       EthIPv4NetworkAddress     10.20.11.192
       EthIPv6NetworkAddress     ::
       MACAddress                00:c0:dd:00:71:ee
       WorldWideName             10:00:00:c0:dd:00:71:ed
       ChassisSerialNumber       033100024
       SymbolicName              SANbox
       ActiveSWVersion           V7.4.x.x.xx.xx
       ActiveTimestamp           day month date time year
       POSTStatus                Passed
       LicensedPorts             24
       SwitchMode                Full Fabric
```

Managing Switch Services

You can configure your switch to suit the demands of your environment by enabling or disabling a variety of switch services. You manage the switch services using the Show Setup Services and Set Setup Services commands. Refer to Table 14-28 for a description of the switch services.

NOTE:

The SSH and SSL services require the Fabric Security license key.

Enter the Show Setup Services command to display the current switch service status as shown in the following example:

```
SANbox #> show setup services
System Services
-----------------------------
TelnetEnabled             True
SSHEnabled                False
GUIMgmtEnabled            True
SSLEnabled                False
EmbeddedGUIEnabled        True
SNMPEnabled               True
NTPEnabled                True
CIMEnabled                True
FTPEnabled                True
MgmtServerEnabled         True
CallHomeEnabled           True
```

Enter the Set Setup Services command within an Admin session to configure the switch services as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> set setup services

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  PLEASE NOTE:
  -----------
  * Further configuration may be required after enabling a service.

  * If services are disabled, the connection to the switch may be lost.

  * When enabling SSL, please verify that the date/time settings
    on this switch and the workstation from where the SSL connection
    will be started match, and then a new certificate may need to be
    created to ensure a secure connection to this switch.

  TelnetEnabled       (True / False)   [True ]
  SSHEnabled          (True / False)   [False]
  GUIMgmtEnabled      (True / False)   [True ]
  SSLEnabled          (True / False)   [False]
  EmbeddedGUIEnabled  (True / False)   [True ]
  SNMPEnabled         (True / False)   [True ]
  NTPEnabled          (True / False)   [False]
  CIMEnabled          (True / False)   [False]
  FTPEnabled          (True / False)   [True ]
  MgmtServerEnabled   (True / False)   [True ]
  CallHomeEnabled     (True / False)   [True ]

  Do you want to save and activate this services setup? (y/n): [n]
```

Managing Switch Configurations

The switch configuration determines the basic operational characteristics of the switch. A switch can save up to 10 configurations including the default configuration, named Default Config. The current switch operating characteristics are determined by the active configuration. Only one configuration can be active at one time.

Each switch configuration contains switch, port, port threshold alarm, and zoning configuration components. Managing Switch Configurations describes the following tasks:

- Displaying a List of Switch Configurations
- Activating a Switch Configuration
- Copying a Switch Configuration
- Deleting a Switch Configuration
- Modifying a Switch Configuration
- Backing Up and Restoring a Switch Configuration

Displaying a List of Switch Configurations

Enter the Config List command to display the configurations stored on the switch as show in the following example. Notice that the Config List command does not require an Admin session.

```
SANbox #> config list

  Current list of configurations
  ------------------------------
  default
  config_1
  config_2
```

Activating a Switch Configuration

Enter the Config Activate command in an Admin session to activate a switch configuration (config_1) as shown in the following example:

```
SANbox (admin) config activate config_1
```

Copying a Switch Configuration

Enter the Config Copy command in an Admin session to create a copy of an existing configuration as shown in the following example:

```
SANbox (admin) config copy config_1 config_2
```

Deleting a Switch Configuration

Enter the Config Delete command in an Admin session to delete a configuration from the switch as shown in the following example. You cannot delete the active configuration nor the default configuration (Default Config).

```
SANbox (admin) config delete config_2
```

Modifying a Switch Configuration

To modify a switch configuration, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time through Telnet, Enterprise Fabric Suite 2007, or another management application. You must also open a Config Edit session with the Config Edit command and indicate which configuration you want to modify. If you do not specify a configuration name the active configuration is assumed.

The Config Edit session provides access to the Set Config commands with which you make modifications to the port, switch, port threshold alarm, or zoning configuration components as shown:

```
SANbox #> admin start
SANbox (admin) #> config edit
   The config named default is being edited.
SANbox (admin-config)#> set config port . . .
SANbox (admin-config)#> set config switch . . .
SANbox (admin-config)#> set config threshold . . .
SANbox (admin-config)#> set config zoning . . .
SANbox (admin-config)#> set config security . . .
```

The Config Save command saves the changes you made during the Config Edit session. In this case, changes to the configuration named *Default* are being saved to a new configuration named *config_10132003*. However, the new configuration does not take effect until you activate it with the Config Activate command:

```
SANbox (admin-config)#> config save config_10132003
SANbox (admin)#> config activate config_10132003
SANbox (admin)#> admin end
```

The Admin End command releases the Admin session for other administrators when you are done making changes to the switch.

The following is an example of the Set Config Switch command. Refer to Table 14-22 for a description of the switch configuration parameters.

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config switch

  A list of attributes with formatting and default values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  AdminState          (1=Online, 2=Offline, 3=Diagnostics)   [Online        ]
  BroadcastEnabled    (True / False)                         [True          ]
  InbandEnabled       (True / False)                         [True          ]
  FDMIEnabled         (True / False)                         [True          ]
  FDMIEntries         (decimal value, 0-1000)                [1000          ]
  DefaultDomainID     (decimal value, 1-239)                 [2             ]
  DomainIDLock        (True / False)                         [False         ]
  SymbolicName        (string, max=32 chars)                 [SANbox        ]
  R_A_TOV             (decimal value, 100-100000 msec)       [10000         ]
  E_D_TOV             (decimal value, 10-20000 msec)         [2000          ]
  PrincipalPriority   (decimal value, 1-255)                 [254           ]
  ConfigDescription   (string, max=64 chars)                 [Default Config]
```

To make temporary changes to the switch administrative state, enter the Set Switch State command.

Backing Up and Restoring a Switch Configuration

Successful management of switches and fabrics depends on the effective use of switch configurations. Backing up and restoring a configuration is useful to protect your work or for use as a template in configuring other switches. Backing up and restoring the switch configuration involves the following:

- Creating the Backup File
- Downloading the Configuration File
- Restoring the Configuration File

Creating the Backup File

The Config Backup command creates a file on the switch, named *configdata*. This file can be used to restore a switch configuration only from the command line interface; it cannot be used to restore a switch using Enterprise Fabric Suite 2007.

```
SANbox #> config backup
```

The *configdata* file contains the following switch configuration information:

- All named switch configurations including port, switch, port threshold alarm and zoning configurations.
- All SNMP and network information defined with the Set Setup command.
- The zoning database includes all zone sets, zones, and aliases.
- The security database except the group primary and secondary secrets.
- The Call Home database and Call Home service configuration.

NOTE:

Configuration backup files are deleted from the switch during a power cycle or switch reset.

Downloading the Configuration File

You use FTP to download the *configdata* file to your workstation for safe keeping and to upload the file back to the switch for the restore function. To download the configdata file, open an FTP session on the switch and login with the account name *images* and password *images*. Transfer the file in binary mode with the Get command as shown in the following example:

```
>ftp ip_address
user:images
password: images
ftp>bin
ftp>get configdata
    xxxxx bytes sent in xx secs.
ftp>quit
```

You should rename the *configdata* file on your workstation with the switch name and date, for example, *config_switch_169_10112003*.

Restoring the Configuration File

The restore operation begins with FTP to upload the configuration file from the workstation to the switch, then finishes with a Telnet session and the Config Restore command. To upload the configuration file, *config_switch_169_10112003* in this case, open and FTP session with account name *images* and password *images*. Transfer the file in binary mode with the Put command as shown in the following example:

```
ftp ip_address
user: images
password: images
ftp> bin
ftp> put config_switch_169_10112003 configdata
  Local file config_switch_169_10112003
  Remote file configdata
ftp>quit
```

The restore process replaces all configuration information on the switch and afterwards the switch is automatically reset. If the restore process changes the IP address, all management sessions are terminated. Use the Set Setup System command to return the IP configuration to the values you want. To restore the switch, open a Telnet session (a new IP address may be required), then enter the Config Restore command from within an Admin session as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> config restore
The switch will be reset after restoring the configuration.
  Please confirm (y/n): [n] y
  Alarm Msg: [day month date time year][A1005.0021][SM][Configuration is being
restored -  this could take several minutes]
  Alarm Msg: [day month date time year][A1000.000A][SM][The switch will be reset in
3 seconds due to a config restore]
SANbox (admin) #>
  Alarm Msg: [day month date time year][A1000.0005][SM][The switch is being reset]
```

Paging a Switch

To help you locate a particular switch in a rack of switches, you can turn on the beacon feature with the Set Beacon command. This causes all port Logged-In LEDs to flash in unison. The following is an example of how to turn the beacon on and off.

```
SANbox #> set beacon on
SANbox $> set beacon off
```

Setting the Date and Time

The switch date and time can be set explicitly using the Date command or it can be set automatically through a Network Time Protocol (NTP) server. The Date command also displays the current time. Unlike the Date command, the NTP server also synchronizes the date and time on the switch with the date and time on the workstation, which is required for Secure Socket Layer (SSL) connections.

NOTE:

To set the date with the Date command, the NTP client must be disabled. For information about disabling the NTPClientEnabled parameter, refer to the Set Setup System command.

If you are using the date command, you can set the time zone using the Set Timezone command. The default time zone is Universal Time (UTC) also known as Greenwich Mean Time (GMT). Changing the time zone converts the current time to the time in the new time zone. For this reason, if you are not using an NTP server, set the time zone first, then set the date and time.

See the following date and time management examples:

- Displaying the Date and Time
- Setting the Date and Time Explicitly
- Setting the Date and Time through NTP

Displaying the Date and Time

Enter the Date command to display the date and time as shown in the following example:

```
SANbox #> date
  Mon Apr 07 07:51:24 200x
```

Setting the Date and Time Explicitly

To set the switch date and time explicitly, use the Set Timezone and Date commands. To change the time zone (to America/North Dakota, for example), enter the Set Timezone command in an Admin session, as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> set timezone
  Africa                                America
  Antarctica                            Asia
  Atlantic                              Australia
  Europe                                Indian
  Pacific                               UTC
        Press ENTER for more options or 'q' to make a selection.

  America/Grenada                       America/Guadeloupe
  America/Guatemala                     America/Guayaquil
  America/Guyana                        America/Halifax
  America/Havana                        America/Hermosillo
  America/Indiana                       America/Indianapolis
  .
  .
  .
  America/Monterrey                     America/Montevideo
  America/Montreal                      America/Montserrat
  America/Nassau                        America/New_York
  America/Nipigon                       America/Nome
  America/Noronha                       America/North_Dakota
  America/Panama                        America/Pangnirtung

        Press ENTER for more options or 'q' to make a selection.
q
  Enter selection (or 'q' to quit): america/north_dakota
  America/North_Dakota/Center
  Enter selection (or 'q' to quit): america/north_dakota/center
```

To set the date and time (January 31, 10:15 AM, 2008), enter the date command, as shown in the following example:

```
SANbox (admin) #> date 013110152008
SANbox (admin) #> date
Thu Jan 31 10:15:03 america/north_dakota/center 2008
```

Setting the Date and Time through NTP

An NTP server can automatically set the switch date and time. To configure the switch to use an NTP server, enter the Set Setup System Ntp command in an Admin session to enable the NTP client on the switch and specify the NPT server IP address, as shown in the following example:

```
SANbox (admin) #> set setup system ntp

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    NTPClientEnabled        False
    NTPServerDiscovery      Static
    NTPServerAddress        10.20.10.10

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    NTPClientEnabled        (True / False)                    : True
    NTPServerDiscovery      (1=Static, 2=Dhcp, 3=Dhcpv6)      :
    NTPServerAddress        (hostname, IPv4, or IPv6 Address) : 10.20.3.4

  Do you want to save and activate this system setup? (y/n): [n] y
```

Resetting a Switch

Table 5-2 describes the methods for resetting a switch, the corresponding command, and the impact on the switch.

Table 5-2. Switch Reset Methods

Description	Hot Reset (Hotreset command)	Soft Reset (Reset Switch command)	Hard Reset (Hardreset Switch command)
Activates pending firmware	✔	✔	✔
Disrupts I/O traffic		✔	✔
Reconnects Enterprise Fabric Suite 2007 and QuickTools sessions afterwards	✔	✔	✔
Clears the event log	✔	✔	✔
Deletes supports files, firmware image files that have not been unpacked, and configuration backup files		✔	✔
Closes all management sessions	✔	✔	✔
Performs power-on self test			✔

Installing Firmware

New firmware becomes available periodically either on CD-ROM or from the QLogic web site. Installing firmware on a switch involves the following steps:

1. Download the firmware image file to the switch.
2. Unpack the firmware image file.
3. Activate the new firmware. The activation can be disruptive or non-disruptive. Refer to “Non-disruptive Activation” on page 5-21 for information about the conditions for a non-disruptive activation.

The Firmware Install and the Image Install commands automate the firmware installation process and perform a disruptive activation as described in “One-Step Firmware Installation” on page 5-22. To perform a nondisruptive activation, refer to “Custom Firmware Installation” on page 5-24.

Non-disruptive Activation

You can load and activate firmware upgrades on an operating switch without disrupting data traffic or having to re-initialize attached devices. If the non-disruptive activation fails, you will usually be prompted to try again later. Otherwise, the switch will perform a disruptive activation. A disruptive activation interrupts Fibre Channel data traffic on the switch, while a non-disruptive activation does not. For information about non-disruptive firmware versions, see the *Firmware Release Notes*.

To ensure a successful non-disruptive activation, you should first satisfy the following conditions:

- No changes are being made to switches in the fabric including powering up, powering down, disconnecting or connecting ISLs, changing switch configurations, or installing firmware.
- No port on the switch is in the diagnostic state.
- No Zoning Edit sessions are open on the switch.
- No changes are being made to attached devices including powering up, powering down, disconnecting, connecting, and HBA configuration changes.
- For a fabric in which one or more switches are running firmware prior to version 7.4, only one Enterprise Fabric Suite 2007 session can be open.

Install firmware on one switch at a time in the fabric. If you are installing firmware on one switch, wait two minutes after the activation is complete before installing firmware on a second switch.

Ports that change states during the non-disruptive activation, will be reset. When the non-disruptive activation is complete, Enterprise Fabric Suite 2007 and QuickTools sessions reconnect automatically. However, Telnet sessions must be restarted manually.

NOTE:

After upgrading firmware that includes changes to QuickTools, a QuickTools session that was open during the upgrade may indicate that the new firmware is not supported. To correct this, close the QuickTools session and the browser window, then open a new QuickTools session.

One-Step Firmware Installation

The Firmware Install and Image Install commands download the firmware image file from an FTP or TFTP server to the switch, unpacks the image file, and performs a disruptive activation in one step. The one-step installation process prompts you to enter the following:

- The file transfer protocol (FTP or TFTP)
- IP address of the remote host
- An account name and password on the remote host (FTP only)
- Pathname for the firmware image file

1. Enter the following commands to download the firmware from a remote host to the switch, install the firmware, then reset the switch to activate the firmware.

```
SANbox #> admin start
SANbox #> firmware install
  The switch will be reset. This process will cause a
  disruption to I/O traffic.
  Continuing with this action will terminate all management
  sessions,including any Telnet sessions. When the firmware
  activation is complete, you may log in to the switch again.
  Do you want to continue? [y/n]: y
  Press 'q' and the ENTER key to abort this command.
```

2. Enter your choice for the file transfer protocol with which to download the firmware image file. FTP requires an user account and a password; TFTP does not.

```
FTP or TFTP     : ftp
```

3. Enter your account name on the remote host (FTP only) and the IP address of the remote host. When prompted for the source file name, enter the path for the firmware image file.

```
User Account    : johndoe
IP Address      : 10.0.0.254
Source Filename : 7.4.00.00_epc
About to install image.  Do you want to continue? [y/n] y
```

4. When prompted to install the new firmware, enter Yes to continue or No to cancel. Entering Yes will disrupt traffic. This is the last opportunity to cancel.

```
About to install image. Do you want to continue? [y/n] y
Connected to 10.20.20.200 (10.20.20.200).
220 localhost.localdomain FTP server (Version wu-2.6.1-18)
ready.
```

5. Enter the password for your account name (FTP only).

```
331 Password required for johndoe.
Password:******
230 User johndoe logged in.
```

6. The firmware will now be downloaded from the remote host to the switch, installed, and activated.

Custom Firmware Installation

A custom firmware installation downloads the firmware image file from a remote host to the switch, unpacks the image file, and resets the switch in separate steps. This allows you to choose the type of switch reset and whether the activation will be disruptive (Reset Switch command) or nondisruptive (Hotreset command). The following example illustrates a custom firmware installation with a nondisruptive activation.

1. Download the firmware image file from the workstation to the switch.

   - If your workstation has an FTP server, you can enter the Image Fetch command:

     ```
     SANbox #> admin start
     SANbox (admin) #> image fetch account_name ip_address filename
     ```

   - If your workstation has a TFTP server, you can enter the Image TFTP command to download the firmware image file.

     ```
     SANbox (admin) #> image tftp ip_address filename
     ```

   - If your workstation has neither an FTP nor a TFTP server, open an FTP session and download the firmware image file by entering FTP commands:

     ```
     >ftp ip_address or switchname
     user:images
     password: images
     ftp>bin
     ftp>put filename
     ftp>quit
     ```

2. Display the list of firmware image files on the switch to confirm that the file was loaded.

   ```
   SANbox #> admin start
   SANbox (admin) $> image list
   ```

3. Unpack the firmware image file to install the new firmware in flash memory.

   ```
   SANbox (admin) $> image unpack filename
   ```

4. Wait for the unpack to complete.

   ```
   Image unpack command result: Passed
   ```

5. A message will prompt you to reset the switch to activate the firmware. Use the Hotreset command to attempt a non-disruptive activation.

```
SANbox (admin) $> hotreset
```

Testing a Switch

You can test all ports on a switch using the Test Switch command. There are three test types: online, offline, and connectivity. Refer to “Testing a Port” on page 6-13 for information about testing individual and ports.

The following sections describe the test types, displaying test status, and cancelling a switch test:

- Online Tests for Switches
- Offline Tests for Switches
- Connectivity Tests for Switches
- Displaying Switch Test Status
- Canceling a Switch Test

Online Tests for Switches

An online test is a non-disruptive test that exercises port-to-device connections for all ports that are online. The following is an example of an online test:

```
SANbox #> admin start
SANbox (admin) #> test switch online

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the default value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.

LoopCount     (decimal value, 1-4294967295)   [100    ]
FrameSize     (decimal value, 40-2148)        [256    ]
DataPattern   (32-bit hex value or 'Default') [Default]
StopOnError   (True / False)                  [True   ]
LoopForever   (True / False)                  [False  ]

Do you want to start the test? (y/n) [n] y
```

Offline Tests for Switches

An offline test is a disruptive test that exercises all port connections for a switch in the diagnostics state. You must place the switch in the diagnostics state using the Set Switch State command before starting the test. There are two types of offline test: internal loopback and external loopback.

- An internal loopback test exercises all internal port connections.
- An external loopback test exercises all internal port and transceiver connections. A transceiver with a loopback plug is required for all ports.

The following example performs an offline internal loopback test on a switch:

```
SANbox #> admin start
SANbox (admin) #>set switch state diagnostics
SANbox (admin) #> test switch offline internal

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the default value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.

LoopCount     (decimal value, 1-4294967295)   [100    ]
FrameSize     (decimal value, 40-2148)        [256    ]
DataPattern   (32-bit hex value or 'Default') [Default]
StopOnError   (True / False)                  [True   ]
LoopForever   (True / False)                  [False  ]

Do you want to start the test? (y/n) [n] y
```

When the test is complete, remember to place the switch back online. The switch resets when it leaves the diagnostics state.

```
SANbox (admin) #> set switch state online
```

Connectivity Tests for Switches

A connectivity test is a disruptive test that exercises all port and inter-port connections for a switch in the diagnostics state. You must place the switch in the diagnostics state using the Set Switch State command before starting the test. There are two types of connectivity test: internal loopback and external loopback.

- An internal loopback test exercises all internal port and inter-port connections.
- An external loopback test exercises all internal port, transceiver, and inter-port connections. A transceiver with a loopback plug is required for all ports.

The following example performs a connectivity internal test on a switch:

```
SANbox #> admin start
SANbox (admin) #>set switch state diagnostics
SANbox (admin) #> test switch connectivity internal
A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  LoopCount     (decimal value, 1-4294967295)                [100    ]
  FrameSize     (decimal value, 40-2148)                     [256    ]
  DataPattern   (32-bit hex value or keyword 'Default')      [Default]
  StopOnError   (True / False)                               [True   ]
  LoopForever   (True / False)                               [False  ]

  Do you want to start the switch test? (y/n): [n] y
```

When the test is complete, remember to place the switch back online. The switch resets when it leaves the diagnostics state.

```
SANbox (admin) #> set switch state online
```

Displaying Switch Test Status

You can display the test status while the test is in progress by entering the Test Status Switch command as shown in the following example:

```
SANbox (admin) #> test status switch

Blade    Test                  Test                  Loop     Test
ID       Type                  Status               Count Failures
-----    ----                  ------               ----- --------
IO0      Offline internal      StoppedOnError          12        2
IO1      Offline internal      NeverRun                 1        0
IO2      Offline internal      Passed                   4        0
IO3      Offline internal      NeverRun                 1        0
IO4      Offline internal      NeverRun                 1        0
IO5      Offline internal      NeverRun                 1        0
IO6      Offline internal      NeverRun                 1        0
IO7      Offline internal      StoppedOnError          12        2
CPU0     Offline internal      NeverRun                 1        0
CPU1     Offline internal      NeverRun                 1        0
```

Canceling a Switch Test

To cancel a switch test that is in progress, enter the Test Cancel Switch command.

Verifying and Tracing Fibre Channel Connections

NOTE:

The Fcping and Fctrace commands require the SANdoctor license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller.

You can verify Fibre Channel connections between the switch and the fabric and display routing information. Enter the Fcping command to verify a Fibre Channel connection to a switch or a device as shown in the following example. The target device can be defined as a Fibre Channel address or a WWN.

```
SANbox #> fcping 970400 count 3
28 bytes from local switch to 0x970400 time = 10 usec
28 bytes from local switch to 0x970400 time = 11 usec
28 bytes from local switch to 0x970400 time = 119 usec
```

The following is an example of a connection failure:

```
SANbox #> fcping 0x113344 count 3
     28 bytes from local switch to 0x113344 failed
```

Enter the Fctrace command to display Fibre Channel routing information between two devices as shown in the following example. The devices can be defined as Fibre Channel addresses or WWNs.

```
SANbox#> fctrace 970400 970e00 hops 5

  36 bytes from 0x970400 to 0x970e00, 5 hops max

  Domain  Ingress Port WWN         Port  Egress Port WWN          Port
  ------  ----------------         ----  ---------------          ----
  97      20:04:00:c0:dd:02:cc:2e  4     20:0e:00:c0:dd:02:cc:2e  14
  97      20:0e:00:c0:dd:02:cc:2e  14    20:04:00:c0:dd:02:cc:2e  4
```

Managing Switch Feature Upgrades

The following features are available to upgrade your switch through the purchase and installation of a license key:

- Enterprise Fabric Suite 2007 is a workstation-based Java® application that provides a graphical user interface for fabric management. This includes Performance View which graphs port performance. Enterprise Fabric Suite 2007 comes with a free 30-day trial license.
- Fabric Security provides for Secure Socket Layer (SSL) and Secure Shell (SSH) connection security, device security using Challenge Handshake Authentication Protocol (CHAP), and remote authentication using a Remote Authentication Dial-In User Service (RADIUS) server.
- SANdoctor provides tools for Fibre Channel connection verification (Fcping command), Fibre Channel route tracing (Fctrace command), and transceiver diagnostic information (Show Media command).
- Port Activation enables additional Fibre Channel ports up to the 24-port maximum.

Installing a feature license key is not disruptive, nor does it require a switch reset. To order a license key, contact your switch distributor or your authorized reseller.

Displaying Feature Licenses

Enter the Feature Log command to display the license keys that are installed on your switch as shown in the following example:

```
SANbox #> feature log
  Mfg Feature Log:
  ----------------
  Switch Licensed for 8 ports
  Customer Feature Log:
  ---------------------
  1) day month date 19:39:24 year - Switch Licensed for 24 ports
  1-LCVXOWUNOJBE6
```

Installing a Feature License Key

Enter the Feature Add command to install a license key on your switch as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> feature add 1-LCVXOWUNOJBE6
License upgrade to 24 ports

Do you want to continue with license upgrade procedure? (y/n): [n] y
Alarm Msg:[day mon date time year][A1005.0030][SM][Upgrading Licensed Ports to 24]
```

Managing Idle Session Timers

You can limit the duration of idle login sessions and idle Admin sessions (Admin Start command). You can specify limits up to 1,440 minutes; specifying 0 means unlimited. Idle login sessions that exceed the limit are logged off (InactivityTimeout). An idle Admin session that exceeds the limit is ended, but the login session may be maintained (AdminTimeout). By default, no limit is enforced on idle login sessions; idle Admin sessions are ended after 30 minutes.

Enter the Show Setup System Timers command to display the idle login and Admin session configuration as shown in the following example:

```
SANbox #> show setup system timers

  System Information
  ------------------
  AdminTimeout             30
  InactivityTimeout        0
```

Enter the Set Setup System Timers command to configure idle login and Admin session limits as shown in the following example:

```
SANbox (admin) #> set setup system timers

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    AdminTimeout            30
    InactivityTimeout       0

  New Value (press ENTER to accept current value, 'q' to quit):
    AdminTimeout            (dec value 0-1440 minutes, 0=never) :
    InactivityTimeout       (dec value 0-1440 minutes, 0=never) :

  Do you want to save and activate this system setup? (y/n): [n]
```

Notes

6 Port Configuration

This section describes the following topics:

- Displaying Port Information
- Modifying Port Operating Characteristics
- Port Binding
- Resetting a Port
- Configuring Port Threshold Alarms
- Testing a Port

Displaying Port Information

You can display the following port information:

- Port Configuration Parameters
- Port Operational Information
- Port Threshold Alarm Configuration Parameters
- Port Performance

Port Configuration Parameters

Enter the Show Config Port command to display the port configuration parameters. These parameters determine the operational characteristics of the port. Refer to Table 14-19 for a description of these parameters.

```
SANbox #> show config port 3

  Configuration Name: default
  ---------------------------

  Port Number: 3
  ------------
  AdminState          Offline
  LinkSpeed           Auto
  PortType            GL
  SymbolicName        Port3
  ALFairness          False
  DeviceScanEnabled   True
  ForceOfflineRSCN    False
  ARB_FF              False
  InteropCredit       0
  ExtCredit           0
  FANEnabled          True
  AutoPerfTuning      False
  LCFEnabled          False
  MFSEnabled          True
  VIEnabled           False
  MSEnabled           True
  NoClose             False
  IOStreamGuard       Disabled
  PDISCPingEnable     True
```

Port Operational Information

Enter the Show Port command to display port operational information.

```
SANbox #> show port 1
  Port Number: 1
  ------------
  AdminState       Online              OperationalState Offline
  AsicNumber       0                   PerfTuningMode   Normal
  AsicPort         2                   PortID           3a0100
  ConfigType       GL                  PortWWN          20:01:00:c0:dd:0d:4f:08
  POSTFaultCode    00000000            RunningType      Unknown
  POSTStatus       Passed              MediaPartNumber  FTLF8528P2BCV
  DownstreamISL    False               MediaRevision    A
  EpConnState      None                MediaType        800-MX-SN-S
  EpIsoReason      NotApplicable       MediaVendor      FINISAR CORP.
  IOStreamGuard    Disabled            MediaVendorID    00009065
  Licensed         True                SymbolicName     Port1
  LinkSpeed        Auto                SyncStatus       SyncLost
  LinkState        Inactive            TestFaultCode    00000000
  LoginStatus      NotLoggedIn         TestStatus       NeverRun
  MaxCredit        16                  UpstreamISL      False
  MediaSpeeds      2Gb/s, 4Gb/s, 8Gb/s XmitterEnabled   True

  ALInit             1                   LIP_F8_F7          0
  ALInitError        0                   LinkFailures       0
  BadFrames          0                   Login              0
  BBCR_FrameFailures 0                   Logout             0
  BBCR_RRDYFailures  0                   LongFramesIn       0
  Class2FramesIn     0                   LoopTimeouts       0
  Class2FramesOut    0                   LossOfSync         0
  Class2WordsIn      0                   LostFrames         0
  Class2WordsOut     0                   LostRRDYs          0
  Class3FramesIn     0                   PrimSeqErrors      0
  Class3FramesOut    0                   RxLinkResets       0
  Class3Toss         0                   RxOfflineSeq       0
  Class3WordsIn      0                   ShortFramesIn      0
  Class3WordsOut     0                   TotalErrors        0
  DecodeErrors       0                   TotalLinkResets    0
  EpConnects         0                   TotalLIPsRecvd     0
  FBusy              0                   TotalLIPsXmitd     2
  FlowErrors         0                   TotalOfflineSeq    0
  FReject            0                   TotalRxFrames      0
  InvalidCRC         0                   TotalRxWords       0
  InvalidDestAddr    0                   TotalTxFrames      0
  LIP_AL_PD_AL_PS    0                   TotalTxWords       0
  LIP_F7_AL_PS       0                   TxLinkResets       0
  LIP_F7_F7          0                   TxOfflineSeq       0
  LIP_F8_AL_PS       0
```

Port Threshold Alarm Configuration Parameters

Enter the Show Config Threshold command to display the port threshold alarm parameters. These parameters determine the error thresholds at which the switch issues alarms. Refer to Table 14-23 for a description of these parameters.

```
SANbox #> show config threshold
  Configuration Name: default
  ------------
  Threshold Configuration Information
  ----------------------------------
  ThresholdMonitoringEnabled      False
  CRCErrorsMonitoringEnabled      True
    RisingTrigger                 25
    FallingTrigger                1
    SampleWindow                  10
  DecodeErrorsMonitoringEnabled   True
    RisingTrigger                 25
    FallingTrigger                0
    SampleWindow                  10
  ISLMonitoringEnabled            True
    RisingTrigger                 2
    FallingTrigger                0
    SampleWindow                  10
  LoginMonitoringEnabled          True
    RisingTrigger                 5
    FallingTrigger                1
    SampleWindow                  10
  LogoutMonitoringEnabled         True
    RisingTrigger                 5
    FallingTrigger                1
    SampleWindow                  10
  LOSMonitoringEnabled            True
    RisingTrigger                 100
    FallingTrigger                5
    SampleWindow                  10
```

Port Performance

Enter the Show Perf command to display port performance in terms of the volume of data transmitted, data received, or errors. You can display continuous live performance information for one or more ports, or an instantaneous summary. The following example displays an instantaneous summary in bytes and frames. Values are expressed in thousands (K) and millions (M) of bytes or frames per second.

```
SANbox #> show perf
  Port   Bytes/s    Bytes/s    Bytes/s    Frames/s   Frames/s   Frames/s
  Number   (in)       (out)    (total)      (in)       (out)    (total)
  ------ -------    -------    -------    --------   --------   --------
  0      7K         136M       136M       245        68K        68K
  1      58K        0          58K        1K         0          1K
  2      0          0          0          0          0          0
  3      0          0          0          0          0          0
  4      0          0          0          0          0          0
  5      0          0          0          0          0          0
  6      0          7K         7K         0          245        245
  7      136M       58K        136M       68K        1K         70K
  8      7K         136M       136M       245        68K        68K
  9      58K        0          58K        1K         0          1K
  10     0          0          0          0          0          0
  11     0          0          0          0          0          0
  12     0          0          0          0          0          0
  13     0          0          0          0          0          0
  14     0          7K         7K         0          245        245
  15     136M       58K        136M       68K        1K         70K
  16     47M        23K        47M        23K        726        24K
  17     0          0          0          0          0          0
  18     23K        47M        47M        726        23K        24K
  19     0          0          0          0          0          0
  20     0          0          0          0          0          0
  21     0          0          0          0          0          0
  22     0          0          0          0          0          0
  23     0          0          0          0          0          0
```

Transceiver Information

NOTE:

The Show Media command requires the SANdoctor license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller.

Enter the Show Media command to display operational information about one or more transceivers as shown in the following example. Refer to Table 14-39 for a description of the transceiver information in the Show Media display.

```
SANbox #> show media 4
Port Number: 4
-------------
MediaType           400-M5-SN-I
MediaVendor         FINISAR CORP.
MediaPartNumber     FTRJ8524P2BNL
MediaRevision       A
MediaSerialNumber   P6G22RL
MediaSpeeds         1Gb/s, 2Gb/s, 4Gb/s

                      Temp      Voltage      Tx Bias      Tx Pwr      Rx Pwr
                       (C)          (V)          (mA)         (mW)        (mW)
                ----------- ----------- ------------ ----------- -----------
      Value           37.32        3.33         7.30       0.373       0.000
      Status         Normal HighWarning       Normal      Normal    LowAlarm
      HighAlarm       95.00        3.90        17.00       0.637       1.264
      HighWarning     90.00        3.70        14.00       0.637       0.791
      LowWarning     -20.00        2.90         2.00       0.082       0.028
      LowAlarm       -25.00        2.70         1.00       0.073       0.019
```

Modifying Port Operating Characteristics

You can make permanent or temporary changes to port operating characteristics. You make permanent port configuration changes using the Set Config Port command. These changes are saved in the active configuration and are preserved across switch or port resets. The Set Port command makes temporary changes that apply until the next port or switch reset, or until you activate a configuration.

NOTE:

8-Gbps SFPs do not support the 1-Gbps setting. Setting a port to 1-Gbps that has an 8-Gbps SFP will down the port.

The following example permanently changes the port 1 administrative state:

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config port 1
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Configuring Port Number:  1
  ------------------------
  AdminState       (1=Online, 2=Offline, 3=Diagnostics, 4=Down)   [Online] offline
  LinkSpeed        (1=Gb/s, 2=2Gb/s, 4=4Gb/s, 8=8Gb/s, A=Auto)    [Auto  ]
  PortType         (GL / G / F / FL / Donor)                      [GL    ]
  SymPortName      (string, max=32 chars)                         [Port1 ]
  ALFairness       (True / False)                                 [False ]
  DeviceScanEnable (True / False)                                 [True  ]
  ForceOfflineRSCN (True / False)                                 [False ]
  ARB_FF           (True / False)                                 [False ]
  InteropCredit    (decimal value, 0-255)                         [0     ]
  FANEnable        (True / False)                                 [True  ]
  AutoPerfTuning   (True / False)                                 [False ]
  LCFEnable        (True / False)                                 [False ]
  MFSEnable        (True / False)                                 [False ]
  VIEnable         (True / False)                                 [False ]
  MSEnable         (True / False)                                 [True  ]
  NoClose          (True / False)                                 [False ]
  IOStreamGuard    (Enable / Disable / Auto)                      [Disable]
  PDISCPingEnable  (True / False)                                 [True  ]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
SANbox (admin-config) #> config save
SANbox (admin-config) #> config activate
```

You can configure all ports based a specified source port using the Set Config Ports command. The following example configures ports 0–23 based on port 3.

```
SANbox #> admin start
SANbox (admin) config edit
SANbox (admin) #> set config ports 3
.
.
.
SANbox (admin-config)#> config save
SANbox (admin)#> config activate
SANbox (admin)#> admin end
```

The following example temporarily changes the port 1 administrative state to Down:

```
SANbox #> admin start
SANbox (admin) #> set port 1 state down
```

Port Binding

Port binding establishes up to 32 switches or devices that are permitted to log in to a particular switch port. Switches or devices that are not among the 32 are refused access to the port. Enter the Show Config Security Portbinding command to display the port binding configuration for all ports as shown in the following example.

```
SANbox #> show config security portbinding

  Configuration Name: default
  -------------------

  Port  Binding Status  WWN
  ----  --------------  ---
  0       True          10:20:30:40:50:60:70:80
  1       True          10:20:30:40:50:60:70:80
  2       False         No port binding entries found.
  3       True          10:20:30:40:50:60:70:80
  4       True          10:20:30:40:50:60:70:80
  5       False         No port binding entries found.
  6       True          10:20:30:40:50:60:70:81
  7       False         No port binding entries found.
  8       True          10:20:30:40:50:60:70:80
  9       False         No port binding entries found.
  10      False         No port binding entries found.
  11      False         No port binding entries found.
  12      False         No port binding entries found.
  13      False         No port binding entries found.
  14      False         No port binding entries found.
  15      False         No port binding entries found.
  16      False         No port binding entries found.
  17      False         No port binding entries found.
  18      False         No port binding entries found.
  19      False         No port binding entries found.
  20      False         No port binding entries found.
  21      False         No port binding entries found.
  22      False         No port binding entries found.
  23      False         No port binding entries found.
```

Enter the Set Config Security Portbinding command to enable port binding for the selected port and to specify the world wide names of the authorized ports/devices. The following example enables port binding on port 1 and specifies two device world wide names.

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config security port 1

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  PortBindingEnabled (True / False)[False] true
  WWN                (N=None / WWN)[None ] 10:00:00:c0:dd:00:b9:f9
  WWN                (N=None / WWN)[None ] 10:00:00:c0:dd:00:b9:f8
  WWN                (N=None / WWN)[None ] n

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
```

Resetting a Port

Enter the Reset Port command to reinitialize one or more ports and to discard any temporary changes that have been made to the administrative state or link speed. The following example reinitializes port 1:

```
SANbox #> reset port 1
```

Configuring Port Threshold Alarms

The switch can monitor a set of port errors and generates alarms based on user-defined sample windows and thresholds. These port errors include the following:

- Cyclic Redundancy Check (CRC) errors
- Decode errors
- ISL connection count
- Device login errors
- Device logout errors
- Loss-of-signal errors

You make changes to the port threshold alarms by modifying the switch configuration as described in “Modifying a Switch Configuration” on page 5-13. Refer to Table 14-23 for a description of the port alarm threshold parameters.

The switch will down a port if an alarm condition is not cleared within three consecutive sampling windows (by default 30 seconds). Reset the port to bring it back online. An alarm is cleared when the threshold monitoring detects that the error rate has fallen below the falling trigger.

Enter the Set Config Threshold command to enable and configure port threshold monitoring on the switch:

```
SANbox #> admin start
SANbox  (admin) #> config edit
SANbox (admin-config) #> set config threshold
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list
press 'q' or 'Q' and the ENTER key to do so.

ThresholdMonitoringEnabled     (True / False)              [False     ]
CRCErrorsMonitoringEnabled     (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [25        ]
  FallingTrigger               (decimal value, 0-1000)     [1         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
DecodeErrorsMonitoringEnabled  (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [25        ]
  FallingTrigger               (decimal value, 0-1000)     [0         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
ISLMonitoringEnabled           (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [2         ]
  FallingTrigger               (decimal value, 0-1000)     [0         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
LoginMonitoringEnabled         (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [5         ]
  FallingTrigger               (decimal value, 0-1000)     [1         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
LogoutMonitoringEnabled        (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [5         ]
  FallingTrigger               (decimal value, 0-1000)     [1         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
 LOSMonitoringEnabled           (True / False)             [True      ]
  RisingTrigger                (decimal value, 1-1000)     [100       ]
  FallingTrigger               (decimal value, 0-1000)     [5         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]

Finished configuring attributes.
This configuration must be saved (see config save command) and activated (see
config activate command) before it can take effect.
To discard this configuration use the config cancel command.
SANbox (admin-config) #> config save
SANbox (admin-config) #> config activate
```

Testing a Port

You can test a port using the Test Port command using online or offline tests. The following sections describe the test types, displaying test results, and cancelling a test:

- Online Tests for Ports
- Offline Tests for Ports
- Display Port Test Results
- Cancel a Port Test

Online Tests for Ports

An online test is a non-disruptive test that exercises the port, transceiver, and device connections. The port must be online and connected to a device. The following is an example of an online test:

```
SANbox #> admin start
SANbox (admin) #> test port 1 online

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the default value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.

LoopCount     (decimal value, 1-4294967295)   [429496729]
FrameSize     (decimal value, 40-2148)        [256      ]
DataPattern   (32-bit hex value or 'Default') [Default  ]
StopOnError   (True / False)                  [True     ]
LoopForever   (True / False)                  [False    ]

Do you want to start the test? (y/n) [n] y

The test has been started.
A notification with the test result(s) will appear
on the screen when the test has completed.

SANbox (admin) #>
  Test for port 1 Passed.
```

Offline Tests for Ports

An offline test is a disruptive test that exercises the port connections. You must place the port in the diagnostics state using the Set Port command before starting the test. There are two types of offline test: internal loopback and external loopback.

- An internal loopback test exercises the internal port connections.
- An external loopback test exercises the port and its transceiver. A transceiver with a loopback plug is required for the port.

The following example performs an offline test:

```
SANbox #> admin start
SANbox (admin) #> set port 1 state diagnostics
SANbox (admin) #> test port 1 offline internal

  A list of attributes with formatting and current values will follow. Enter a new
  value or simply press the ENTER key to accept the default value. If you wish to
  terminate this process before reaching the end of the list press 'q' or 'Q' and
  the ENTER key to do so.

  LoopCount     (decimal value, 1-4294967295)   [429496729]
  FrameSize     (decimal value, 40-2148)        [256      ]
  DataPattern   (32-bit hex value or 'Default') [Default  ]
  StopOnError   (True / False)                  [True     ]
  LoopForever   (True / False)                  [False    ]

  Do you want to start the test? (y/n) [n] y

  The test has been started.
  A notification with the test result(s) will appear
  on the screen when the test has completed.

SANbox (admin) #>
  Test for port 1 Passed.
```

When the test is complete, remember to place the port back online.

```
SANbox (admin) #> set port 1 state online
```

Display Port Test Results

You can display the test status while the test is in progress by entering the Test Status Port command in an Admin session as shown in the following example:

```
SANbox (admin) #> test status port 1
Port               Test                Test                Loop      Test
Num      Port      Type                Status             Count  Failures
----     --------  ----                ------             -----  --------
1        1         Offline Internal    Passed                12         0
```

Cancel a Port Test

To cancel a port test that is in progress, enter the Test Cancel Port command.

```
SANbox #> show donor

  Port    Config Ext Credit Max Credit Donated Member of   Valid Groups to
  Number  Type   Requested  Available  to Port Donor Group Extend Credit
  ------  ------ ---------- ---------- ------- ----------- ---------------
  0       GL     0          16         None    0           0
  1       GL     0          16         None    0           0
  2       GL     0          16         None    0           0
  3       GL     0          16         None    0           0
  4       GL     0          16         None    0           0
  5       GL     0          16         None    0           0
  6       GL     0          16         None    0           0
  7       GL     0          16         None    0           0
  8       GL     0          16         None    0           0
  9       GL     0          16         None    0           0
  10      GL     0          16         None    0           0
  11      GL     0          16         None    0           0
  12      GL     0          16         None    0           0
  13      GL     0          16         None    0           0
  14      GL     0          16         None    0           0
  15      GL     0          16         None    0           0
  16      GL     0          16         None    0           0
  17      GL     0          16         None    0           0
  18      GL     0          16         None    0           0
  19      GL     0          16         None    0           0
  20      G      0          16         None    None        None
  21      G      0          16         None    None        None
  22      G      0          16         None    None        None
  23      G      0          16         None    None        None
  Donor Group  Credit Pool
  -----------  -----------
  0            0
```

Notes

7 Zoning Configuration

This section describes the following tasks:

- Displaying Zoning Database Information
- Configuring the Zoning Database
- Modifying the Zoning Database
- Saving the Active and Merged Zone Sets
- Resetting the Zoning Database
- Managing Zone Sets
- Managing Zones
- Managing Aliases

Consider device access needs within the fabric. Access is controlled by the use of zoning. Some zoning strategies include the following:

- Separate devices by operating system.
- Separate devices that have no need to communicate with other devices in the fabric or have classified data.
- Separate devices into department, administrative, or other functional group.
- Reserve a path and its bandwidth from one port to another.

A zone is a named group of ports or devices. Members of the same zone can communicate with each other and transmit outside the zone, but cannot receive inbound traffic from outside the zone.

Zoning divides the fabric for purposes of controlling discovery and inbound traffic. Zoning is hardware-enforced only when a port/device is a member of no more than eight zones whose combined membership does not exceed 64. If this condition is not satisfied, that port behaves as a soft zone member. You can assign ports/devices to a zone individually or as a group by creating an alias.

A zone can be a component of more than one zone set. Several zone sets can be defined for a fabric, but only one zone set can be active at one time. The active zone set determines the current fabric zoning.

Displaying Zoning Database Information

A switch maintains three zoning databases:

- Non-volatile–This zoning database is permanent and contains all zone sets, zones, and aliases that you create and save on a switch. The zone sets in the non-volatile zoning database are known as configured zone sets.
- Volatile–This zoning database is temporary. This means it is not retained across switch resets. The volatile zoning database can be the working copy of a zone set being edited or the active zone set received from another switch. In the latter case, this is also known as the merged zone set.
- Active–This zoning database is the active zone set.

You can display the following information about the zoning database:

- Configured Zone Set Information
- Active Zone Set Information
- Merged Zone Set Information
- Edited Zone Set Information
- Zone Set Membership Information
- Orphan Zone Information
- Alias and Alias Membership Information
- Zoning Modification History
- Zoning Database Limits

Configured Zone Set Information

The Zoneset List and the Zoning List commands display information about the all zone sets in the non-volatile zoning database. Enter the Zoneset List command to display a list of the zone sets as shown in the following example:

```
SANbox #> zoneset list

  Current List of ZoneSets
  ------------------------
  alpha
  beta
```

Enter the Zoning List command to display all zone sets, zones, and zone members in the active zone set and configured zone sets as shown in the following example. Merged and edited zone sets are displayed if they exist.

```
SANbox #> zoning list

  Active (enforced) ZoneSet Information
  ZoneSet     Zone      ZoneMember
  -------------------------------
  wwn
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:c3

  Configured (saved in NVRAM) Zoning Information
  ZoneSet     Zone      ZoneMember
  -------------------------------
  wwn
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:16
```

Active Zone Set Information

The Zoning List and Zoneset Active commands display information about the active zone set. Enter the Zoning Active command to display component zones and zone members as shown in the following example:

```
SANbox #> zoning active
Active (enforced) ZoneSet Information
  ZoneSet     Zone      ZoneMember
  --------------------------------
  wwn
              wwn_b0241f
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        21:00:00:e0:8b:02:41:2f
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:c3
```

Enter the Zoneset Active command to display the name of the active zone set and its activation history as shown in the following example:

```
SANbox #> zoneset active

  Active ZoneSet Information
  --------------------------
  ActiveZoneSet    Bets
  LastActivatedBy  admin@OB-session6
  LastActivatedOn  day month date time year
```

Merged Zone Set Information

A merged zone set is a zone set that is received from another switch as a result of a change in active zone sets. You can display the merged zone set on your switch if the MergeAutoSave parameter is set to False. Refer to “Configuring the Zoning Database” on page 7-10 for more information about the MergeAutoSave parameter. Enter the Zoning Merged command to display merged zone set information as shown in the following example:

```
SANbox #> zoning merged
**********************************************************************
To permanently save the merged database locally, execute the
'zoning merged capture' command. To edit the merged database
use the ’zoning edit merged’ command. To remove the merged database
use the ’zoning restore’ command.
**********************************************************************
Merged (unsaved) Zoning Information
ZoneSet         Zone            ZoneMember
-------         ----            ----------
ZS1
                Z1
                                10:00:00:c0:dd:00:b9:f9
                                10:00:00:c0:dd:00:b9:fa
                Z2
                                10:00:00:c0:dd:00:b9:fb
                                10:00:00:c0:dd:00:b9:fc
```

Edited Zone Set Information

The edited zone set is a zone set that you were modifying when a change in active zone set or a fabric merge occurred. Enter the Zoning Edited command to display the unsaved edited zone set information as shown in the following example:

```
SANbox (admin-zoning) #> zoning edited
Edited (unsaved) Zoning Information
ZoneSet         Zone            ZoneMember
-------         ----            ----------
ZS1
                Z1
                                10:00:00:c0:dd:00:b9:f9
                                10:00:00:c0:dd:00:b9:fa
```

Zone Set Membership Information

The Zoneset Zones, Zone List, and Zone Zonesets commands display zone set membership information. Enter the Zoneset Zones command to display the member zones for a specified zone set as shown in the following example:

```
SANbox #> zoneset zones ssss

  Current List of Zones for ZoneSet: ssss
  ---------------------------------
  zone1
  zone2
  zone3
```

Enter the Zone List command to display the zones and the zone sets to which they belong as shown in the following example:

```
SANbox #> zone list

  Zone        ZoneSet
  ----        -------
  wwn_b0241f
              zone_set_1

  wwn_23bd31
              zone_set_1

  wwn_221416
              zone_set_2

  wwn_2215c3
              zone_set_2

  wwn_0160ed
              zone_set_3
```

Enter the Zone Zonesets command to display the zone sets for which a specified zone is a member as shown in the following example:

```
SANbox #> zone zonesets zone1

  Current List of ZoneSets for Zone: zone1
  ---------------------------------
  zone_set_1
```

Zone Membership Information

Enter the Zone Members command to display the members for a specified zone as shown in the following example:

```
SANbox #> zone members wwn_b0241f

  Current List of Members for Zone: wwn_b0241f
  --------------------------------
  50:06:04:82:bf:d2:18:c2
  50:06:04:82:bf:d2:18:d2
  21:00:00:e0:8b:02:41:2f
```

Orphan Zone Information

Enter the Zone Orphans command to display a list of zones that are not members of any zone set as shown in the following example:

```
SANbox #> zone orphans
Current list of orphan zones
----------------------------
zone3
zone4
```

Alias and Alias Membership Information

The Alias List and Alias Members commands display information about aliases. Enter the Alias List command to display a list of all aliases as shown in the following example:

```
SANbox #> alias list

  Current list of Zone Aliases
  ----------------------------
  alias1
  alias2
```

Enter the Alias Members command to display the membership for a specified alias as shown in the following example:

```
SANbox #> alias members alias1

  Current list of members for Zone Alias: alias1
  --------------------------------------
  50:06:04:82:bf:d2:18:c4
  50:06:04:82:bf:d2:18:c5
  50:06:04:82:bf:d2:18:c6
```

Zoning Modification History

Enter the Zoning History command to display a record of zoning modifications as shown in the following example:

```
SANbox #> zoning history
  Active Database Information
  ---------------------------
  ZoneSetLastActivated/DeactivatedBy  Remote
  ZoneSetLastActivated/DeactivatedOn  day mon date hh:mm:ss yyyy
  Database Checksum                   00000000

  Inactive Database Information
  -----------------------------
  ConfigurationLastEditedBy           admin@OB-session17
  ConfigurationLastEditedOn           day mon date hh:mm:ss yyyy
  Database Checksum                   00000000
```

History information includes the following:

- Time of the most recent zone set activation or deactivation and the user account that performed it
- Time of the most recent modifications to the zoning database and the user account that made them.
- Checksum for the zoning database

Zoning Database Limits

Enter the Zoning Limits command to display a summary of the objects in the zoning database and their maximum limit as shown in the following example:

```
SANbox #> zoning limits

Configured (saved in NVRAM) Zoning Information

  Zoning Attribute     Maximum   Current   [Zoning Name]
  ----------------     -------   -------   -------------
  MaxZoneSets          256       6
  MaxZones             2000      17
  MaxAliases           2500      1
  MaxTotalMembers      10000     166
  MaxZonesInZoneSets   2000      19
  MaxMembersPerZone    2000
                                 10        D_1_JBOD_1
                                 23        D_1_Photons
                                 9         D_2_JBOD1
                                 16        D_2_NewJBOD_2
                                 5         E1JBOD1
                                 5         E2JBOD2
                                 3         LinkResetZone
                                 3         LinkResetZone2
                                 8         NewJBOD1
                                 8         NewJBOD2
                                 24        Q_1Photon1
                                 8         Q_1_NewJBOD1
                                 13        Q_1_Photon_1
                                 21        Q_2_NewJBOD2
                                 3         ZoneAlias
                                 3         ZoneDomainPort
                                 4         ZoneFCAddr
  MaxMembersPerAlias   2000
                                 2         AliasInAZone
  ActiveZones                    19
  ActiveZoneMembers              160
```

To display abbreviated limits information, enter the Zoning Limits Brief command.

Configuring the Zoning Database

You can configure how the zoning database is applied to the switch and exchanged with the fabric through the zoning configuration parameters. The following zoning configuration parameters are available through the Set Config Zoning command. Refer to Table 14-24 for more information about the zoning configuration parameters.

- MergeAutoSave–This parameter enables or disables the automatic saving of a new active zone set to the switch non-volatile zoning database.
- DefaultZone–This parameter allows or denies communication among ports/devices that are not defined in the active zone set.
- DiscardInactive–This parameter enables or disables the discarding of all zone sets except the active zone set.

If MergeAutoSave is False on a switch, and a new zone set is activated elsewhere in the fabric or a fabric merge occurs, you can choose how to dispose of the merged zone set:

- Enter the Zoning Merged command to display merged zone set.
- Enter the Zoning Edit Merged command to edit the merged zone set.
- Enter the Zoning Merged Capture command to save the merged zone set to the non-volatile zoning database.
- Enter the Zoning Restore command to discard the merged zone set.

If you are editing the configured zone set that corresponds to the active zone set, and a zone set merge occurs, you have the same options plus you can enter the Zoning Edited command to display the edited zoning database.

To restore the zoning configuration to its factory values, enter the Reset Config or Reset Factory commands. Notice however, these commands restore other aspects of the switch configuration also.

To modify the zoning configuration, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time through Telnet, QuickTools, Enterprise Fabric Suite 2007, or another management application. You must also open a Config Edit session with the Config Edit command and indicate which configuration you want to modify. If you do not specify a configuration name, the active configuration is assumed.

The Config Edit session provides access to the Set Config Zoning command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> config edit
   The config named default is being edited.
SANbox (admin-config) #> set config zoning
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list press 'q'
or 'Q' and the ENTER key to do so.

  MergeAutoSave        (True / False)  [True ]
  DefaultZone          (Allow / Deny)  [Allow ]
  DiscardInactive      (True / False)  [False]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.

SANbox (admin-config)#> config save
SANbox (admin)#> config activate
SANbox (admin)#> admin end
```

Modifying the Zoning Database

To modify the non-volatile zoning database, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time through Telnet, Enterprise Fabric Suite 2007, or another management application. You must also open a Zoning Edit session with the Zoning Edit Configured command. To modify the temporary merged zone set (if one exists), enter the Zoning Edit Merged command. The Zoning Edit session provides access to the Zoneset, Zone, Alias, and Zoning commands with which you make modifications to the zoning database.

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning)#> zoneset . . .
SANbox (admin-zoning)#> zone . . .
SANbox (admin-zoning)#> alias . . .
SANbox (admin-zoning)#> zoning . . .
```

When you are finished making changes, enter the Zoning Save command to save the changes and close the Zoning Edit session.

```
SANbox (admin-zoning)#> zoning save
```

To close the Zoning Edit session without saving changes, enter the Zoning Cancel command.

```
SANbox (admin-zoning)#> zoning cancel
```

Changes to the active zone set do not take effect until you activate it with the Zoneset Activate command. The active zone set is propagated throughout the fabric.

```
SANbox (admin)#> zoneset activate zoneset_1
SANbox (admin)#> admin end
```

The Admin End command releases the Admin session for other administrators when you are done making changes to the switch.

To remove all zoning database objects (aliases, zones, and zone sets) and restore the zoning database to its factory state, enter the Reset Zoning command as shown in the following example:

```
SANbox (admin) #> reset zoning
```

Saving the Active and Merged Zone Sets

You can save the active zone set and merged zone set to the non-volatile zoning database. Enter the Zoning Active Capture to save the active zone set as shown in the following example:

```
SANbox (admin) #> zoning active capture
  This command will overwrite the configured zoning database in NVRAM.
  Please confirm (y/n): [n] y

  The active zoning database has been saved.
```

Enter the Zoning Merged Capture to the save the merged zone set as shown in the following example:

```
SANbox (admin) #> zoning merged capture
  This command will overwrite the configured zoning database in NVRAM.
  Please confirm (y/n): [n] y

  The merged zoning database has been saved.
```

Resetting the Zoning Database

There are two ways to remove all aliases, zones, and zone sets from the zoning database:

- Enter the Zoning Clear command as shown in the following example:

  ```
  SANbox #> admin start
  SANbox (admin) #> zoning edit
  SANbox (admin-zoning) #> zoning clear
  SANbox (admin-zoning) #> zoning save
  ```

- Enter the Reset Zoning command as shown in the following example. The zoning configuration values, MergeAutoSave, DefaultZone, and DiscardInactive remain unchanged. This is the preferred method.

  ```
  SANbox #> admin start
  SANbox (admin) #> reset zoning
  ```

Removing Inactive Zone Sets, Zones, and Aliases

Enter the Zoning Delete Orphans command to delete all objects from the zoning database except those in the active zone set.

```
SANbox #> admin start
SANbox (admin) #> zoning delete orphans
   This command will remove all zonesets, zones, and aliases
   that are not currently active.
Please confirm (y/n): [n] y
SANbox (admin) #> zoning save
```

Managing Zone Sets

Managing zone sets consists of the following tasks:

- Create a Zone Set
- Delete a Zone Set
- Rename a Zone Set
- Copy a Zone Set
- Add Zones to a Zone Set
- Remove Zones from a Zone Set
- Activate a Zone Set
- Deactivate a Zone Set

All of these tasks except Activate a Zone Set and Deactivate a Zone Set require an Admin session and a Zoning Edit session.

Create a Zone Set

Enter the Zoneset Create command to create a new zone set as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoneset create zoneset_1
SANbox (admin-zoning) #>zoning save
```

Delete a Zone Set

Enter the Zoneset Delete command to delete a zone set as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoneset delete zoneset_1
SANbox (admin-zoning) #>zoning save
```

Rename a Zone Set

Enter the Zoneset Rename command to rename a zone set as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoneset rename zoneset_old zoneset_new
SANbox (admin-zoning) #>zoning save
```

Copy a Zone Set

Enter the Zoneset Copy command to copy a zone set and its contents to a new zone set as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoneset copy zoneset_1 zoneset_2
SANbox (admin-zoning) #>zoning save
```

Add Zones to a Zone Set

Enter the Zoneset Add command to add a zone to a zone set as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoneset add zoneset_1 zone_1 zone_2
SANbox (admin-zoning) #>zoning save
```

Remove Zones from a Zone Set

Enter the Zoneset Remove command to remove zones from a zone set as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoneset remove zoneset_1 zone_1 zone_2
SANbox (admin-zoning) #>zoning save
```

Activate a Zone Set

Enter the Zoneset Activate command to apply zoning to the fabric as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoneset activate zoneset_1
```

Deactivate a Zone Set

Enter the Zoneset Deactivate command to deactivate the active zone set and disable zoning in the fabric:

```
SANbox #> admin start
SANbox (admin) #> zoneset deactivate
```

Managing Zones

Managing Zones consists of the following tasks:

- Create a Zone
- Delete a Zone
- Rename a Zone
- Copy a Zone
- Add Members to a Zone
- Remove Members from a Zone

All of these tasks require an Admin session and a Zoning Edit session.

Create a Zone

Enter the Zone Create command to create a new zone as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zone create zone_1
SANbox (admin-zoning) #> zoning save
```

Delete a Zone

Enter the Zone Delete command to delete zone_1 from the zoning database as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zone delete zone_1
SANbox (admin-zoning) #> zoning save
```

Rename a Zone

Enter the Zone Rename command to rename zone_1 to zone_a as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zone rename zone_1 zone_a
SANbox (admin-zoning) #> zoning save
```

Copy a Zone

Enter the Zone Copy command to copy the contents of an existing zone (zone_1) to a new zone (zone_2) as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zone copy zone_1 zone_2
SANbox (admin-zoning) #> zoning save
```

Add Members to a Zone

Enter the Zone Add command to add ports/devices to zone_1 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zone add zone_1 alias_1 1,4 1,5
SANbox (admin-zoning) #> zoning save
```

Remove Members from a Zone

Enter the Zone Remove command to remove ports/devices from zone_1 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zone remove zone_1 alias_1 1,4 1,5
SANbox (admin-zoning) #> zoning save
```

Managing Aliases

Managing aliases consists of the following tasks:

- Create an Alias
- Delete an Alias
- Rename an Alias
- Copy an Alias
- Add Members to an Alias
- Remove Members from an Alias

All of these tasks require an Admin session and a Zoning Edit session.

Create an Alias

Enter the Alias Create command to create a new alias as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> alias create alias_1
SANbox (admin-zoning) #> zoning save
```

Delete an Alias

Enter the Alias Delete command to delete alias_1 from the zoning database as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> alias delete alias_1
SANbox (admin-zoning) #> zoning save
```

Rename an Alias

Enter the Alias Rename command to rename alias_1 to alias_a as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> alias rename alias_1 alias_a
SANbox (admin-zoning) #> zoning save
```

Copy an Alias

Enter the Alias Copy command to copy alias_1 and its contents to alias_2 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> alias copy alias_1 alias_2
SANbox (admin-zoning) #> zoning save
```

Add Members to an Alias

Enter the Alias Add command to add ports/devices to alias_1 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> alias add alias_1  1,4 1,5
SANbox (admin-zoning) #> zoning save
```

Remove Members from an Alias

Enter the Alias Remove command to remove ports/devices from alias_1 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> alias remove alias_1 1,4 1,5
SANbox (admin-zoning) #> zoning save
```

8 Connection Security Configuration

NOTE:

SSH and SSL connection security require the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller.

This section describes the following tasks:

- Managing SSL and SSH Services
- Displaying SSL and SSH Services
- Creating an SSL Security Certificate

The switch supports secure connections with Telnet and switch management applications. The Secure SHell protocol (SSH) secures Telnet connections to the switch. The Secure Sockets Layer (SSL) protocol secures switch connections to the following management applications:

- Enterprise Fabric Suite 2007
- QuickTools
- Application Programming Interface
- Storage Management Initiative-Specification (SMI-S)

Managing SSL and SSH Services

Consider the following when enabling SSH and SSL services:

- To establish a secure Telnet connection, your workstation must use an SSH client.
- To enable secure SSL connections, you must first synchronize the date and time on the switch and workstation. Refer to “Setting the Date and Time” on page 5-17.
- The SSL service must be enabled to authenticate users through a RADIUS server. Refer to “Configuring a RADIUS Server on the Switch” on page 10-3.
- To disable SSL when using a user authentication RADIUS server, the RADIUS server authentication order must be local.
- Enabling SSL automatically creates a security certificate on the switch.

Enter the Set Setup Services command to manage both SSH and SSL services as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> set setup services
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  PLEASE NOTE:
  -----------
  * Further configuration may be required after enabling a service.

  * If services are disabled, the connection to the switch may be lost.

  * When enabling SSL, please verify that the date/time settings
    on this switch and the workstation from where the SSL connection
    will be started match, and then a new certificate may need to be
    created to ensure a secure connection to this switch.

  TelnetEnabled       (True / False)   [True ]
  SSHEnabled          (True / False)   [False] True
  GUIMgmtEnabled      (True / False)   [True ]
  SSLEnabled          (True / False)   [False] True
  EmbeddedGUIEnabled  (True / False)   [True ]
  SNMPEnabled         (True / False)   [True ]
  NTPEnabled          (True / False)   [False]
  CIMEnabled          (True / False)   [False]
  FTPEnabled          (True / False)   [True ]
  MgmtServerEnabled   (True / False)   [True ]

  Do you want to save and activate this services setup? (y/n): [n] y
```

Displaying SSL and SSH Services

Enter the Show Setup Services command to display the status of the SSH and SSL services as shown in the following example:

```
SANbox #> show setup services
System Services
----------------------------
TelnetEnabled             True
SSHEnabled                False
GUIMgmtEnabled            True
SSLEnabled                False
EmbeddedGUIEnabled        True
SNMPEnabled               True
NTPEnabled                True
CIMEnabled                True
FTPEnabled                True
MgmtServerEnabled         True
CallHomeEnabled           True
```

Creating an SSL Security Certificate

Enabling SSL automatically creates a security certificate on the switch. The security certificate is required to establish an SSL connection with a management application such as Enterprise Fabric Suite 2007 or QuickTools. The certificate is valid 24 hours before the certificate creation date and expires 365 days after the creation date. Should the original certificate become invalid, enter the Create Certificate command to create a new one as shown in the following example:

```
SANbox (admin) #> create certificate
  The current date and time is day mon date hh:mm:ss UTC yyyy.
  This is the time used to stamp onto the certificate.
  Is the date and time correct? (y/n): [n] y
  Certificate generation successful.
```

To ensure the creation of a valid certificate, be sure that the switch and the workstation time and date are the same. Refer to “Setting the Date and Time” on page 5-17.

Notes

9 Device Security Configuration

NOTE:

Device security requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller.

This section describes the following tasks:

- Displaying Security Database Information
- Configuring the Security Database
- Modifying the Security Database
- Resetting the Security Database
- Managing Security Sets
- Managing Groups

Device security provides for the authorization and authentication of devices that you attach to a switch. You can configure a switch with a group of devices against which the switch authorizes new attachments by devices, other switches, or devices issuing management server commands.

Device security is defined through the use of security sets and groups. A group is a list of device worldwide names that are authorized to attach to a switch. There are three types of groups: one for other switches (ISL), another for devices (port), and a third for devices issuing management server commands (MS). A security set is a set of up to three groups with no more than one of each group type. The security database is made up of all security sets on the switch.

In addition to authorization, the switch can be configured to require authentication to validate the identity of the connecting switch, device, or host. Authentication can be performed locally using the switch's security database, or remotely using a Remote Dial-In User Service (RADIUS) server such as Microsoft® RADIUS.

Displaying Security Database Information

You can display the following information about the security database:

- Configured Security Set Information
- Active Security Set Information
- Security Set Membership Information
- Group Membership Information
- Security Database Modification History
- Security Database Limits

Configured Security Set Information

The Securityset List and the Security List commands display information about the all security sets in the security database. Enter the Securityset List command to display a list of the security sets as shown in the following example:

```
SANbox #> securityset list
Current list of SecuritySets
----------------------------
  alpha
  beta
```

Enter the Security List command to display all security sets, groups, and group members in the security database as shown in the following example:

```
SANbox #> security list
  Active Security Information
  SecuritySet  Group  GroupMember
  -----------  -----  -----------
  No active securityset defined.

  Configured Security Information
  SecuritySet  Group  GroupMember
  -----------  -----  -----------
  alpha
              group1 (ISL)
                     10:00:00:00:00:10:21:16
                        Authentication     Chap
                        Primary Hash       MD5
                        Primary Secret     ********
                        Secondary Hash     SHA-1
                        Secondary Secret   ********
                        Binding            0
                     10:00:00:00:00:10:21:17
                        Authentication     Chap
                        Primary Hash       MD5
                        Primary Secret     ********
                        Secondary Hash     SHA-1
                        Secondary Secret   ********
                        Binding            0
```

Active Security Set Information

The Security Active and Securityset Active commands display information about the active security set. Enter the Security Active command to display component groups and group members as shown in the following example:

```
SANbox #> security active
  Active Security Information

  SecuritySet  Group  GroupMember
  -----------  -----  -----------
  alpha
               group1 (ISL)
                      10:00:00:00:00:10:21:16
                         Authentication     Chap
                         Primary Hash       MD5
                         Primary Secret     ********
                         Secondary Hash     SHA-1
                         Secondary Secret   ********
                         Binding            0
                      10:00:00:00:00:10:21:17
                         Authentication     Chap
                         Primary Hash       MD5
                         Primary Secret     ********
                         Secondary Hash     SHA-1
                         Secondary Secret   ********
                         Binding            0
```

Enter the Securityset Active command to display the name of the active security set and its activation history as shown in the following example:

```
SANbox #> securityset active
  Active SecuritySet Information
  ------------------------------
  ActiveSecuritySet alpha
  LastActivatedBy  Remote
  LastActivatedOn  day month date time year
```

Security Set Membership Information

The Securityset Groups and Group Securitysets commands display security set membership information. Enter the Securityset Groups command to display the member groups for a specified security set as shown in the following example:

```
SANbox #> securityset groups alpha
  Current list of Groups for SecuritySet: alpha
  --------------------------------------
  group1 (ISL)
  group2 (Port)
```

Enter the Group Securitysets command to display the security sets for which a specified group is a member as shown in the following example:

```
SANbox #> group securitysets group_1

  Current list of SecuritySets for Group: group_1
  --------------------------------------
  SecuritySet_1
  SecuritySet_2
  SecuritySet_A
  SecuritySet_B
```

Group Membership Information

Enter the Group Members command to display the members for a specified group as shown in the following example:

```
SANbox #> group members group_1
  Current list of members for Group: group_1
  ----------------------------------
  10:00:00:c0:dd:00:71:ed
  10:00:00:c0:dd:00:72:45
  10:00:00:c0:dd:00:90:ef
  10:00:00:c0:dd:00:b8:b7
```

Security Database Modification History

Enter the Security History command to display a record of security database modifications as shown in the following example:

```
SANbox #> security history
  Active Database Information
  ---------------------------
  SecuritySetLastActivated/DeactivatedBy  Remote
  SecuritySetLastActivated/DeactivatedOn  day month date time year
  Database Checksum                   00000000

  Inactive Database Information
  -----------------------------
  ConfigurationLastEditedBy           admin@IB-session11
  ConfigurationLastEditedOn           day month date time year
  Database Checksum                   00007558
```

History information includes the following:

- Time of the most recent security set activation or deactivation and the user account that performed it
- Time of the most recent modifications to the security database and the user account that made them
- Checksum for the security database

Security Database Limits

Enter the Security Limits command to display a summary of the objects in the security database and their maximum limit as shown in the following example:

```
SANbox #> security limits
  Security Attribute   Maximum   Current   [Name]
  ------------------   -------   -------   ------
  MaxSecuritySets      4         1
  MaxGroups            16        2
  MaxTotalMembers      1000      19
  MaxMembersPerGroup   1000
                                 4         group1
                                 15        group2
```

Configuring the Security Database

You can configure how the security database is applied to the switch and exchanged with the fabric through the security configuration parameters. The following security configuration parameters are available through the Set Config Security command:

- AutoSave–This parameter enables or disables the saving of changes to active security set in the switch's non-volatile security database.
- FabricBindingEnabled–This parameter enables or disables the configuration and enforcement of fabric binding on all switches in the fabric. Fabric binding associates switch worldwide names with a domain ID in the creation of ISL groups.

If AutoSave is False, you can revert device security changes that have been received from another switch through the activation of a security set, or merging of fabrics. Enter the Security Restore command to replace the volatile security database with the contents of the non-volatile security database.

To restore the security configuration to its factory values, you can enter the Reset Config or Reset Factory command. Notice however, that these commands restore other aspects of the switch configuration also.

To modify the security configuration, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time either through the CLI, QuickTools, or Enterprise Fabric Suite 2007. You must also open a Config Edit session with the Config Edit command and indicate which configuration you want to modify. If you do not specify a configuration name, the active configuration is assumed. The Config Edit session provides access to the Set Config Security command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config security
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  FabricBindingEnabled  (True / False)     [False]
  AutoSave              (True / False)     [True ]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.

SANbox (admin-config)#> config save
SANbox (admin)#> config activate
SANbox (admin)#> admin end
```

Modifying the Security Database

To modify the security database, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time either through the CLI, QuickTools, or Enterprise Fabric Suite 2007. You must also open a Security Edit session with the Security Edit command. The Security Edit session provides access to the Securityset, Group, and Security commands with which you make modifications to the security database.

```
SANbox #> admin start
SANbox (admin) #> security edit
SANbox (admin-security)#> securityset . . .
SANbox (admin-security)#> group . . .
SANbox (admin-security)#> security . . .
```

When you are finished making changes, enter the Security Save command to save the changes and close the Security Edit session.

```
SANbox (admin-security)#> security save
```

To close the session without saving changes, enter the Security Cancel command.

```
SANbox (admin-security)#> security cancel
```

Changes to the active security set do not take effect until you activate it with the Security Activate command. The Admin End command releases the Admin session for other administrators when you are done making changes to the switch.

```
SANbox (admin)#> security activate
SANbox (admin)#> admin end
```

Resetting the Security Database

There are two ways to remove all groups and security sets from the security database:

- Enter the Security Clear command as shown in the following example:

```
SANbox (admin-security) #> security clear
  All security information will be cleared.  Please confirm (y/n): [n] y
SANbox (admin-security) #> security save
```

- Enter the Reset Security command as shown in the following example. The security configuration values, autosave and fabric binding remain unchanged.

```
SANbox (admin) #> reset security
```

Managing Security Sets

Managing Security Sets consists of the following tasks:

- Create a Security Set
- Delete a Security Set
- Rename a Security Set
- Copy a Security Set
- Add Groups to a Security Set
- Remove Groups from a Security Set
- Activate a Security Set
- Deactivate a Security Set

All of these tasks except Activate a Security Set and Deactivate a Security Set require a Security Edit session.

Create a Security Set

Enter the Securityset Create command to create a new security set as shown in the following example:

```
SANbox (admin-security) #> securityset create securityset_1
```

Delete a Security Set

Enter the Securityset Delete command to delete a security set as shown in the following example:

```
SANbox (admin-security) #> securityset delete securityset_1
```

Rename a Security Set

Enter the Securityset Rename command to rename a security set as shown in the following example:

```
SANbox (admin-security) #> securityset rename securityset_old securityset_new
```

Copy a Security Set

Enter the Securityset Copy command to copy a security set and its contents to a new security set as shown in the following example:

```
SANbox (admin-security) #> securityset copy securityset_1 securityset_2
```

Add Groups to a Security Set

Enter the Securityset Add command to add a group to a security set as shown in the following example:

```
SANbox (admin-security) #> securityset add securityset_1 group_isl group_port
```

Remove Groups from a Security Set

Enter the Securityset Remove command to remove groups from a security set as shown in the following example:

```
SANbox (admin-security) #> sescurityset remove securityset_1 group_isl group_port
```

Activate a Security Set

Enter the Securityset Activate command to apply security to the fabric as shown in the following example:

```
SANbox (admin) #> securityset activate securityset_1
```

Deactivate a Security Set

Enter the Securityset Deactivate command to deactivate the active security set and disable security in the fabric:

```
SANbox (admin) #> securityset deactivate
```

Managing Groups

Managing Groups consists of the following tasks:

- Create a Group
- Delete a Group
- Rename a Group
- Copy a Group
- Add Members to a Group
- Modify a Group Member
- Remove Members from a Group

All of these tasks require an Admin session and a Security Edit session.

Create a Group

Creating a group involves specifying a group name and a group type. There are three types of groups:

- ISL group–secures connected switches
- Port group–secures connected devices
- MS group–secures management server commands

Enter the Group Create command to create a new port group as shown in the following example:

```
SANbox (admin-security) #> group create group_port port
```

Delete a Group

Enter the Group Delete command to delete group_port from the security database as shown in the following example:

```
SANbox (admin-security) #> group delete group_port
```

Rename a Group

Enter the Group Rename command to rename group_port to port_1 as shown in the following example:

```
SANbox (admin-security) #> group rename group_port port_1
```

Copy a Group

Enter the Group Copy command to copy the contents of an existing group (group_port) to a new group (port_1) as shown in the following example:

```
SANbox (admin-security) #> group copy group_port port_1
```

Add Members to a Group

Adding a member to a group involves specifying a group, the member worldwide name, and the member attributes. The member attributes define the authentication method, encryption method, secrets, and fabric binding, depending on the group type.

- For ISL member attributes, refer to Table 14-2.
- For Port member attributes, refer to Table 14-3.
- For MS member attributes, refer to Table 14-4.

Enter the Group Add command to add a member to a group:

```
SANbox #> admin start
SANbox (admin) #> security edit
SANbox (admin-security) #> group add Group_1
  A list of attributes with formatting and default values will follow
  Enter a new value or simply press the ENTER key to accept the current value
  with exception of the Group Member WWN field which is mandatory.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.
  Group Name       Group_1
  Group Type       ISL
  Member          (WWN)                          [00:00:00:00:00:00:00:00] 10:00:00:c0:dd:00:90:a3
  Authentication  (None / Chap)                    [None                   ] chap
  PrimaryHash     (MD5 / SHA-1)                    [MD5                    ]
  PrimarySecret   (32 hex or 16 ASCII char value)  [                       ] 0123456789abcdef
  SecondaryHash   (MD5 / SHA-1 / None)             [None                   ]
  SecondarySecret (40 hex or 20 ASCII char value)  [                       ]
  Binding         (domain ID 1-239, 0=None)        [0                      ]

  Finished configuring attributes.
  To discard this configuration use the security cancel command.
```

Modify a Group Member

Modifying a group member involves changing the member attributes. The member attributes define the authentication method, encryption methods, secrets, and fabric binding, depending on the group type.

- For ISL member attributes, refer to Table 14-2.
- For Port member attributes, refer to Table 14-3.
- For MS member attributes, refer to Table 14-4.

Enter the Group Edit command to change the attributes of a group member:

```
SANbox #> admin start
SANbox (admin) #> security edit
SANbox (admin-security) #> group edit G1 10:00:00:c0:dd:00:90:a3
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.
  Group Name        g1
  Group Type        ISL
  Group Member      10:00:00:c0:dd:00:90:a3
  Authentication    (None / Chap)                   [None]  chap
  PrimaryHash       (MD5 / SHA-1)                   [MD5 ]  sha-1
  PrimarySecret     (40 hex or 20 ASCII char value) [    ]  12345678901234567890
  SecondaryHash     (MD5 / SHA-1 / None)            [None]  md5
  SecondarySecret   (32 hex or 16 ASCII char value) [    ]  1234567890123456
  Binding           (domain ID 1-239, 0=None)       [3   ]

  Finished configuring attributes.
  To discard this configuration use the security cancel command.
```

Remove Members from a Group

Enter the Group Remove command to remove a member from a group as shown in the following example:

```
SANbox (admin-security) #> group remove group_1 10:00:00:c0:dd:00:90:a3
```

10 RADIUS Server Configuration

NOTE:

RADIUS server configuration requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller.

Authentication can be performed locally using the switch's security database, or remotely using a Remote Dial-In User Service (RADIUS) server such as Microsoft RADIUS. With a RADIUS server, the security database for the entire fabric resides on the server. In this way, the security database can be managed centrally, rather than on each switch. You can configure up to five RADIUS servers to provide failover.

You can configure the RADIUS server to authenticate just the switch or both the switch and the initiator device if the device supports authentication. When using a RADIUS server, every switch in the fabric must have a network connection. A RADIUS server can also be configured to authenticate user accounts. Refer to Section 3 for information about user accounts. A secure connection is required to authenticate user logins with a RADIUS server. Refer to Section 8 for information about secure connections.

This section describes the following tasks:

- Displaying RADIUS Server Information
- Configuring a RADIUS Server on the Switch

Displaying RADIUS Server Information

Enter the Show Setup Radius command to display RADIUS server information as shown in the following example. Refer to Table 14-26 for a description of the RADIUS configuration parameters.

```
SANbox #> show setup radius
    Radius Information
  ------------------
  DeviceAuthOrder   Local
  UserAuthOrder     Local
  TotalServers      2

  Server: 1

  ServerIPAddress   10.0.0.13
  ServerUDPPort     1812
  DeviceAuthServer  False
  UserAuthServer    False
  AccountingServer  False
  Timeout           2
  Retries           0
  SignPackets       False
  Secret            ********

  Server: 2

  ServerIPAddress   bacd:1234:bacd:1234:bacd:1234:bacd:1234
  ServerUDPPort     1812
  DeviceAuthServer  True
  UserAuthServer    True
  AccountingServer  True
  Timeout           2
  Retries           0
  SignPackets       False
  Secret            ********
```

Configuring a RADIUS Server on the Switch

Enter the Set Setup Radius command to configure a RADIUS server on the switch. There are two groups of RADIUS configuration parameters. One group of parameters is common to all RADIUS server configurations. The second group is server specific. You can configure both groups of parameters for all RADIUS servers, or you can configure the common and server-specific parameters separately. Refer to Table 14-26 for a description of the common and server-specific RADIUS configuration parameters.

The following example configures the common RADIUS server configuration parameters:

```
SANbox (admin) #> set setup radius common
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the attributes
  for the server being processed, press 'q' or 'Q' and the ENTER key to do so.
  If you wish to terminate the configuration process completely, press 'qq' or
  'QQ' and the ENTER key to so do.

  PLEASE NOTE:
  -----------
  * SSL must be enabled in order to configure RADIUS User Authentication
    SSL can be enabled using the 'set setup services' command.

  Current Values:
    DeviceAuthOrder  Local
    UserAuthOrder    Local
    TotalServers     1

  New Value (press ENTER to not specify value, 'q' to quit):
    DeviceAuthOrder  1=Local, 2=Radius, 3=RadiusLocal :
    UserAuthOrder    1=Local, 2=Radius, 3=RadiusLocal :
    TotalServers     decimal value, 0-5               :

  Do you want to save and activate this radius setup? (y/n): [n]
```

The following example configures RADIUS server 1:

```
SANbox (admin) #> set setup radius server 1
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the attributes
  for the server being processed, press 'q' or 'Q' and the ENTER key to do so.
  If you wish to terminate the configuration process completely, press 'qq' or
  'QQ' and the ENTER key to so do.

  PLEASE NOTE:
  -----------
  * SSL must be enabled in order to configure RADIUS User Authentication
    SSL can be enabled using the 'set setup services' command.

Server 1 Current Values:
  ServerIPAddress 10.20.11.8
  ServerUDPPort 1812
  DeviceAuthServer True
  UserAuthServer True
  AccountingServer False
  Timeout 10
  Retries 0
  SignPackets False
  Secret **********

New Server 1 Value (press ENTER to accept current value, 'q' to skip):
  ServerIPAddress            (hostname, IPv4, or IPv6 address)     :
  ServerUDPPort              (decimal value)                       :
  DeviceAuthServer           (True / False)                        :
  UserAuthServer             (True / False)                        :
  AccountingServer           (True / False)                        :
  Timeout                    (decimal value, 10-30 secs)           :
  Retries                    (decimal value, 1-3, 0=None)          :
  SignPackets                (True / False)                        :
  Secret                     (1-63 characters, recommend 22+)      :

  Do you want to save and activate this radius setup? (y/n): [n]
```

11 Event Log Configuration

This section describes the following tasks:

- Starting and Stopping Event Logging
- Displaying the Event Log
- Managing the Event Log Configuration
- Clearing the Event Log
- Logging to a Remote Host
- Creating and Downloading a Log File

Event messages originate from the switch or from the management application in response to events that occur in the fabric. Refer to the *SANbox Fibre Channel Switch Event Message Guide* for a complete listing of switch event messages.

Events are classified by the following severity levels:

- Alarm–The alarm level describes events that are disruptive to the administration or operation of a fabric and require administrator intervention. Alarms are always logged and always displayed on the screen. Alarm thresholds can be defined for certain port errors to customize when to generate an alarm.
- Critical–The critical level describes events that are generally disruptive to the administration or operation of the fabric, but require no action.
- Warning–The warning level describes events that are generally not disruptive to the administration or operation of the fabric, but are more important than the informative level events.
- Informative–The informative level describes routine events associated with a normal fabric.

Starting and Stopping Event Logging

Enter the Set Log Stop command in an Admin session to stop recording event messages in the switch Log as shown in the following example:

```
SANbox (admin) #> set log stop
```

Enter the Set Log Start command to start recording event message in the switch log as shown in the following example:

```
SANbox (admin) #> set log start
```

Displaying the Event Log

Enter the Show Log command to display the event log. Each message has the following format:

```
[ordinal][time_stamp][severity][message_ID][source][message_text]
```

Table 11-1 describes the message format components.

Table 11-1. Event Log Message Format

Component	Description
[ordinal]	A number assigned to each message in sequence since the last time the alarm history was cleared.
[time_stamp]	The time the alarm was issued in the format day month hh:mm:ss.ms UTC yyyy. This time stamp comes from the switch for events that originate with the switch, and from the workstation for events that originate with QuickTools or Enterprise Fabric Suite 2007
[severity]	The event severity: A–Alarm, C–Critical, W–Warning, I–Informative
[message_ID]	A number that identifies the message using the following format: category.message_number
[source]	The program module or application that generated the event. Sources include Zoning, Switch, PortApp, EPort, Management Server. Alarms do not include the source.
[message_text]	The message text

The following is an example of the Show Log command:

```
SANbox #> show log
   [327][day month date time year][I][Eport Port:0/8][Eport State=
   E_A0_GET_DOMAIN_ID]
   [328][day month date time year][I][Eport Port: 0/8][FSPF PortUp state=0]
   [329][day month date time year][I][Eport Port: 0/8][Sending init hello]
   [330][day month date time year][I][Eport Port: 0/8][Processing EFP, oxid= 0x8]
   [331][day month date time year][I][Eport Port: 0/8][Eport State = E_A2_IDLE]
   [332][day month date time year][I][Eport Port: 0/8][EFP,WWN= 0x100000c0dd00b845,
   len= 0x30]
   [333][day month date time year][I][Eport Port: 0/8][Sending LSU oxid=0xc:type=1]
   [334][day month date time year][I][Eport Port: 0/8][Send Zone Merge Request]
   [335][day month date time year][I][Eport Port: 0/8][LSDB Xchg timer set]
```

You can also filter the event log display with the Show Log Display command and customize the messages that display automatically in the output stream.

- Filtering the Event Log Display
- Controlling Messages in the Output Stream

Filtering the Event Log Display

You can customize what events are displayed according to the component or severity level. Enter the Show Log Display command to filter the events in the display. You can choose from the following severity levels and component events:

- Informative events
- Warning events
- Critical events
- E_Port events
- Management server events
- Name server events
- Port events
- Switch management events
- Simple Network Management Protocol (SNMP) events
- Zoning events

The following example filters the event log display for critical events.

```
SANbox #> show log display critical
```

Controlling Messages in the Output Stream

Enter the Set Log Display command in an Admin session to specify the severity level filter to use to determine what messages are automatically displayed on the screen when they occur. Alarms are always included in the output stream. The following example includes warning and critical level messages in the output stream:

```
SANbox (admin) #> set log display warn
```

Managing the Event Log Configuration

Managing the Event Log Configuration consists of the following tasks:

- Configure the Event Log
- Display the Event Log Configuration
- Restore the Event Log Configuration

Configure the Event Log

You can customize what events are recorded in the switch event log according to component, severity level, and port. Enter the Set Log Component, Set Log Level, and Set Log Port commands in an Admin session to filter the events to be recorded. You can choose from the following component events:

- E_Port events
- Management server events
- Name server events
- Port events
- Switch management events
- Simple Network Management Protocol (SNMP) events
- Zoning events
- Call Home events

The following example configures the event log to record switch management events with warning and critical severity levels associated with ports 0–3. Entering the Set Log Save command ensures that this configuration is preserved across switch resets.

```
SANbox (admin) #> set log component switch
SANbox (admin) #> set log level warn
SANbox (admin) #> set log port 0 1 2 3
SANbox (admin) #> set log save
```

Display the Event Log Configuration

Enter the Show Log Settings command to display all event log configuration settings as shown in the following example:

```
SANbox #> show log settings
Current settings for log
------------------------
Started           True
FilterComponent   NameServer MgmtServer Zoning Switch Blade Port Eport Snmp CLI QFS
FilterLevel       Info
DisplayLevel      Critical
FilterPort        0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
```

Restore the Event Log Configuration

Enter the Set Log Restore command in an Admin session to return the event log configuration to the factory default as shown in the following example:

```
SANbox (admin) #> set log restore
```

Clearing the Event Log

Enter the Set Log Clear command in an Admin session to delete all entries in the event log as shown in the following example:

```
SANbox (admin) #> set log clear
```

Logging to a Remote Host

The switch comes from the factory with local logging enabled, which instructs the switch firmware to maintain an event log in switch memory. The switch can also be configured to log events to a remote host that supports the syslog protocol. This requires that you enable remote logging on the switch and specify an IP address for the remote host.

NOTE:

To log event messages on a remote host, you must edit the syslog.conf file on the remote host and then restart the syslog daemon. The syslog.conf file must contain an entry that specifies the name of the log file. Add the following line to the syslog.conf file. A <tab> separates the selector field (local0.info) and action field which contains the log file path name (/var/adm/messages/messages.name).

```
local0.info <tab> /var/adm/messages/messages.name
```

Consult your host operating system documentation for information on how to configure remote logging.

Enter the Set Setup System Logging command to control local logging through the LocalLogEnabled parameter, and remote logging through the RemoteLogEnabled and RemoteLogHostAddress parameters as shown in the following example:

```
SANbox (admin) #> set setup system logging

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    LocalLogEnabled         True
    RemoteLogEnabled        False
    RemoteLogHostAddress    10.0.0.254

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    LocalLogEnabled         (True / False)                    :
    RemoteLogEnabled        (True / False)                    :
    RemoteLogHostAddress    (hostname, IPv4, or IPv6 Address) :

  Do you want to save and activate this system setup? (y/n): [n]
```

Creating and Downloading a Log File

Enter the Set Log Archive command to collect the event log messages in a file on the switch named *logfile*. This file can have a maximum of 1200 event messages. Use FTP to download the file from the switch to your workstation as follows:

1. Log into the switch through Telnet and create an archive of the event log. Enter the Set Log Archive command in an Admin session to create a file on the switch named *logfile*.

```
SANbox  #> admin start
SANbox (admin) #> set log archive
```

2. Open an FTP session on the switch and log in with the account name *images* and password *images*. Transfer the file *logfile* in binary mode with the Get command.

```
>ftp ip_address
user:images
password: images
ftp>bin
ftp>get logfile
    xxxxx bytes sent in xx secs.
ftp>quit
```

Notes

12 Call Home Configuration

This section describes the following topics:

- Call Home Concepts
- Configuring the Call Home Service
- Managing the Call Home Database
- Testing a Call Home Profile
- Changing SMTP Servers
- Clearing the Call Home Message Queue
- Resetting the Call Home Database

Call Home Concepts

The Call Home service improves fabric availability by notifying administrators by email of events that affect switch operation. The Call Home service is active by default and is controlled by the Set Setup Services command. To display the Call Home service status, enter the Show Setup Services command. To better understand the Call Home service, consider the following:

- Call Home Requirements
- Call Home Messages
- Technical Support Interface

Call Home Requirements

In addition to enabling the Call Home service, you must also do the following to ensure that email messages can be sent:

- Configure the Call Home service. The Call Home service configuration consists of primary and secondary SMTP server specifications and contact information. You must enable and specify an address and service port for at least one SMTP server. Refer to “Configuring the Call Home Service” on page 12-5.
- Configure the Call Home database The Call Home database consists of up to 25 Call Home profiles. Each profile defines the following:
  - Event severity levels (Alarm, Critical, Warn) that will initiate an email message
  - Email message format and subject
  - Email recipients

  Multiple profiles make it possible to notify different audiences based on any combination of event severity, message format (short or full), or message length. You configure profiles using the Profile command within a Callhome Edit session. Refer to “Managing the Call Home Database” on page 12-6.
- Ensure that each switch that is to support Call Home email notification has its own Ethernet connection.

Enter the Callhome Test command to test your Call Home service and database configurations. Refer to “Testing a Call Home Profile” on page 12-15.

Call Home Messages

The Call Home service generates email messages for the specified event severity level and the following switch actions:

- Switch comes online
- Switch goes offline
- Reboot
- Power up
- Power down[1]
- SFP failure

When a qualifying switch action or event occurs, an email message is created and placed in the Call Home queue to be sent to the active SMTP server. You can monitor activity in the queue using the Callhome Queue Stats command. You can also clear the queue of email messages using the Callhome Queue Clear command.

There are three email message formats: full text, short text, and Tsc1. The full-text format contains the switch and event information, plus the contact information from the Call Home profile and SNMP configurations. The short-text and Tsc1 formats contains basic switch and event information; Tsc1 is formatted for automated parsing. The following is an example of a short-text email:

```
From: john.doe@qlogic.com [mailto:john.doe@qlogic.com]
Sent: Wednesday, July 25, 2007 5:03 PM
Subject: [CallHome: Test] Alarm generated on Switch_8


SwitchName:  Switch_8_83.215
SwitchIP:    10.20.30.40
SwitchWWN:   10:00:00:c0:dd:0c:66:f2
Level:       Alarm
Text:        CALLHOME TEST PROFILE MESSAGE
ID:          8B00.0002
Time:        Wed Jul 25 17:02:40.343 CDT 2007
```

[1] If the switch is forced to power-down before the message is sent to the SMTP server, no message will be transmitted.

The following is an example of a full-text email including profile and SNMP contact information:

```
From: john.doe@work.com [mailto:john.doe@work.com]
Sent: Wednesday, July 25, 2007 5:03 PM
Subject: [CallHome: Test] Alarm generated on Switch_8


------------ Event Details
SwitchName:  Switch_8_83.215
SwitchIP:    10.20.30.40
SwitchWWN:   10:00:00:c0:dd:0c:66:f2
Level:       Alarm
Text:        CALLHOME TEST PROFILE MESSAGE
ID:          8B00.0002
Time:        Wed Jul 25 17:02:40.343 CDT 2007


------------ Switch Location
Room 123; Rack 9; Bay 3


------------ Contact Information
George Smith
12345 4th Street, City, State
952-999-9999
george.smith@work.com
```

Technical Support Interface

The Tech_Support_Center profile provides a way to collect and send switch status and trend data periodically by e-mail to specified technical support resources. To use this feature, you must create a profile named Tech_Support_Center. The Capture command enables you to add instructions to the Tech_Support_Center profile to specify the frequency with which to e-mail this data. For more information, refer to “Adding a Data Capture Configuration” on page 12-13.

Configuring the Call Home Service

Enter the Set Setup Callhome command in an Admin session to configure the Call Home service as shown in the following example. Refer to Table 14-25 for a description of the Call Home service configuration entries.

```
SANbox (admin) #> set setup callhome

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the current value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.
If either the Primary or Secondary SMTP Servers are enabled, the FromEmailAddress
attribute must be configured or the switch will not attempt to deliver messages.
Current Values:

  PrimarySMTPServerAddr      0.0.0.0
  PrimarySMTPServerPort      25
  PrimarySMTPServerEnable    False
  SecondarySMTPServerAddr    0.0.0.0
  SecondarySMTPServerPort    25
  SecondarySMTPServerEnable  False
  ContactEmailAddress        nobody@localhost.localdomain
  PhoneNumber                <undefined>
  StreetAddress              <undefined>
  FromEmailAddress           nobody@localhost.localdomain
  ReplyToEmailAddress        nobody@localhost.localdomain
  ThrottleDupsEnabled        True

New Value (press ENTER to accept current value, 'q' to quit):
  PrimarySMTPServerAddr      (IPv4, IPv6, or hostname)  :
  PrimarySMTPServerPort      (decimal value)            :
  PrimarySMTPServerEnable    (True / False)             :
  SecondarySMTPServerAddr    (IPv4, IPv6, or hostname)  :
  SecondarySMTPServerPort    (decimal value)            :
  SecondarySMTPServerEanble  (True / False)             :
  ContactEmailAddress        (ex: admin@company.com)    :
  PhoneNumber                (ex: +1-800-123-4567)      :
  StreetAddress              (include all address info) :
  FromEmailAddress           (ex: bldg3@company.com)    :
  ReplyToEmailAddress        (ex: admin3@company.com)   :
  ThrottleDupsEnabled        (True / False)             :

  Do you want to save and activate this Callhome setup? (y/n):
```

Enter the Show Setup Callhome command to display the Call Home service configuration as shown in the following example.

```
SANbox #> show setup callhome
  Callhome Information
  --------------------
  PrimarySMTPServerAddr       0.0.0.0
  PrimarySMTPServerPort       25
  PrimarySMTPServerEnabled    False
  SecondarySMTPServerAddr     0.0.0.0
  SecondarySMTPServerPort     25
  SecondarySMTPServerEnabled  False
  ContactEmailAddress         nobody@localhost.localdomain
  PhoneNumber                 <undefined>
  StreetAddress               <undefined>
  FromEmailAddress            nobody@localhost.localdomain
  ReplyToEmailAddress         nobody@localhost.localdomain
  ThrottleDupsEnabled         True

  + indicates active SMTP server
```

Managing the Call Home Database

To modify the Call Home database, you must open an Admin session with the Admin Start command. An Admin session prevents other accounts from making changes at the same time through Telnet, QuickTools, Enterprise Fabric Suite 2007, or another management application. You must also open a Callhome Edit session with the Callhome Edit command. The Callhome Edit session provides access to the Callhome, Capture, and Profile commands with which you make modifications to the Call Home database.

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome)#> callhome . . .
SANbox (admin-callhome)#> profile . . .
SANbox (admin-callhome)#> capture . . .
```

When you are finished making changes, enter the Callhome Save command to save the changes and close the Callhome Edit session. Changes take effect immediately.

```
SANbox (admin-callhome)#> callhome save
```

To close the Callhome Edit session without saving changes, enter the Callhome Cancel command.

```
SANbox (admin-callhome)#> callhome cancel
```

The Admin End command releases the Admin session for other administrators when you are done making changes to the switch.

To remove all Call Home profiles and restore the Call Home service configuration to its factory state, enter the Reset Callhome command.

```
SANbox (admin) #> reset callhome
```

Managing the Call Home database consists of the following tasks:

- Displaying Call Home Database Information
- Creating a Profile
- Deleting a Profile
- Modifying a Profile
- Renaming a Profile
- Copying a Profile
- Adding a Data Capture Configuration
- Modifying a Data Capture Configuration
- Deleting a Data Capture Configuration

Displaying Call Home Database Information

Enter the Callhome History command to display the Call Home data base change history information as shown in the following example:

```
SANbox #> callhome history
   CallHome Database History
   -------------------------
   ConfigurationLastEditedBy       admin@OB-session2
   ConfigurationLastEditedOn       day mmm dd hh:mm:ss yyyy
   DatabaseChecksum                000014a3
   ProfileName                     group4
   ProfileLevel                    Warn
   ProcessedCount                  286
   ProcessedLast                   day mmm dd hh:mm:ss yyyy
   ProfileName                     group5
   ProfileLevel                    Alarm
   ProcessedCount                  25
   ProcessedLast                   day mmm dd hh:mm:ss yyyy
```

Enter the Callhome List command to display a list of Call Home profiles as shown in the following example:

```
SANbox #> callhome list

 Configured Profiles:
 --------------------
 group4
 group5
```

Enter the Callhome List Profile command to display a list of Call Home profiles and their details as shown in the following example:

```
SANbox #> callhome list profile

ProfileName: group4
------------
Level             Warn
Format            FullText
MaxSize           any size up to max of 100000
EmailSubject      CallHome Warn
RecipientEmail    admin1@company.com
RecipientEmail    admin2@company.com
RecipientEmail    admin3@company.com
RecipientEmail    admin7@company.com
RecipientEmail    admin8@company.com
RecipientEmail    admin9@company.com
RecipientEmail    admin10@company.com

ProfileName:      group5
------------
Level             Alarm
Format            ShortText
MaxSize           any size up to max of 40000
EmailSubject      CallHome Alarm
RecipientEmail    me1@company.com
RecipientEmail    me10@company.com
```

Enter the Callhome Queue Stats command to display information about email messages in the Call Home queue as shown in the following example:

```
SANbox #> callhome queue stats
  Callhome Queue Information
  --------------------------
  FileSystemSpaceInUse        534 (bytes)
  EntriesInQueue                3
```

Creating a Profile

Enter the Profile Create command to create a Call Home profile as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile create profile_1
A list of attributes with formatting and default values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list
press 'q' or 'Q' and the ENTER key to do so.

Default Values:
  Level           Alarm
  Format          FullText
  MaxSize         100000
  EmailSubject    <undefined>
  RecipientEmail  (up to 10 entries allowed)

New Value (press ENTER to accept default value, 'q' to quit):
  Level           (Alarm,Critical,Warn,None)        :
  Format          (1=FullText, 2=ShortText, 3=Tsc1) :
  MaxSize         (decimal value, 650-100000)       :
  EmailSubject    (string, max=64 chars, N=None)    : Technical problem
  RecipientEmail  (ex: admin@company.com, N=None)
  1. <undefined>                                    : admin0@company.com

The profile has been created.
This configuration must be saved with the callhome save command
before it can take effect, or to discard this configuration
use the callhome cancel command.

SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Deleting a Profile

Enter the Profile Delete command to delete a Call Home profile as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile delete profile_1

  The profile will be deleted. Please confirm (y/n): [n] y

SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Modifying a Profile

Enter the Profile Edit command to modify an existing Call Home profile as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile edit profile_1
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    Level           Alarm
    Format          ShortText
    MaxSize         1000
    EmailSubject    Switch Problem
    RecipientEmail  (up to 10 entries allowed)
    1. john.smith@domain.com

  New Value (press ENTER to accept current value, 'q' to quit):
    Level           (Alarm,Critical,Warn,None)        :
    Format          (1=FullText, 2=ShortText, 3=Tsc1) : 1
    MaxSize         (decimal value, 650-100000)       :
    EmailSubject    (string, max=64 chars, N=None)    :
    RecipientEmail  (ex: admin@company.com, N=None)
    1. john.smith@domain.com                          :
    2. <undefined>                                    :

  The profile has been edited.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.

SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Renaming a Profile

Enter the Profile Rename command to rename profile_1 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile rename profile_1 profile_4

  The profile will be renamed. Please confirm (y/n): [n] y

SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Copying a Profile

Enter the Profile Copy command to copy profile_1 as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile copy profile_1 profile_a
SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Adding a Data Capture Configuration

Enter the Capture Add command to add a data capture configuration to the Tech_Support_Center profile as shown in the following example. If the Tech_Support_Center profile does not exist, you must create it using the Profile Create command.

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> capture add
  A list of attributes with formatting and default values will follow.
  Enter a value or simply press the ENTER key to accept the default value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Value (press ENTER to accept the default, 'q' to quit):
    TimeOfDay  (HH:MM)                       [02:00]
    DayOfWeek  (Sun,Mon,Tue,Wed,Thu,Fri,Sat) [Sat  ]
    Interval   (decimal value, 1-26 weeks)   [1    ]

  A capture entry has been added to profile Tech_Support_Center.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.
```

Modifying a Data Capture Configuration

Enter the Capture Edit command to modify a data capture configuration in the Tech_Support_Center profile as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> capture edit
Capture Entries for Profile:  Tech_Support_Center

  Index  TimeOfDay  DayOfWeek  Interval
  -----  ---------  ---------  --------
  1      02:00      Sat        1 (weeks)

Please select a capture entry from the list above ('q' to quit): 1

  A list of attributes with formatting and current values will follow.
  Enter a value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Value (press ENTER to accept the default, 'q' to quit):
    TimeOfDay  (HH:MM)                       [02:00]
    DayOfWeek  (Sun,Mon,Tue,Wed,Thu,Fri,Sat) [Sat  ]
    Interval   (decimal value, 1-26 weeks)   [1    ]

  The selected capture entry has been edited for profile Tech_Support_Center.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.
```

Deleting a Data Capture Configuration

Enter the Capture Remove command to delete a data capture configuration from the Tech_Support_Center profile as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> capture remove
Capture Entries for Profile:  Tech_Support_Center

  Index  TimeOfDay  DayOfWeek  Interval
  -----  ---------  ---------  --------
  1      02:00      Sat        1 (weeks)

  Please select a capture entry from the list above ('q' to quit): 1

  The selected capture entry has been removed from profile Tech_Support_Center.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.
```

Testing a Call Home Profile

Enter the Callhome Test Profile command to test a Call Home profile as shown in the following example. This command generates a test message and routes it to the email recipients specified in the profile.

```
SANbox #> admin start
SANbox (admin) #> callhome test profile group4
  A callhome profile test has been started.
  A notification with the test result will appear
  on the screen when the test has completed.
SANbox (admin) #>
  Test for Callhome Profile group4 Passed.
```

Changing SMTP Servers

The Call Home service configuration enables you to specify a primary and a secondary SMTP server to which the switch connects. The active server is the server that receives messages from the switch. By default, the primary SMTP server is the active server. Should the active server lose connection, control passes automatically to the other server. You can explicitly change the active server by entering the Callhome Changeover command as shown in the following example:

```
SANbox #> admin start
SANbox #> callhome edit
SANbox #> (admin-callhome) #> callhome changeover

The currently active CallHome SMTP server will change.  Please confirm (y/n): [n] y
```

Though the active server status changes, the primary SMTP server remains the primary, and the secondary SMTP server remains the secondary.

Clearing the Call Home Message Queue

Enter the Callhome Queue Clear command to clear email messages from the Call Home message queue as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> callhome queue clear
  The callhome queue will be cleared. Please confirm (y/n): [n] y
```

Refer to the Callhome Queue Stats command to display the contents of the Call Home message queue.

Resetting the Call Home Database

There are two ways to reset the Call Home database. Enter the Callhome Clear command to clear all Callhome profiles as shown in the following example. This command resets the Tech_Support_Center profile to the factory default, but does not affect the Call Home service configuration.

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> callhome clear
SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Enter the Reset Callhome command to clear all Call Home profiles and resets the Tech_Support_Center profile and Call Home service configuration to the factory defaults as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> reset callhome
The callhome configuration will be reset and the default values activated.
Please confirm (y/n): [n] y

Reset and activation in progress ....
```

Notes

13 Simple Network Management Protocol Configuration

This section describes the following tasks:

- Managing the SNMP Service
- Displaying SNMP Information
- Modifying the SNMP Configuration
- Resetting the SNMP Configuration
- Managing the SNMP Version 3 Configuration

The Simple Network Management Protocol (SNMP) provides for the management of the switch through third-party applications that use SNMP. Security consists of a read community string and a write community string that serve as passwords that control read and write access to the switch. These strings are set at the factory to well-known defaults and should be changed if SNMP is to be enabled. The switch supports SNMP version 3 in the CLI, which is disabled by default.

Managing the SNMP Service

You control the SNMP service SNMPEnabled parameters through the Set Setup SNMP or Set Setup Services commands. Refer to “Modifying the SNMP Configuration” on page 13-4 for more information.

Enter the Set Setup Services command to enable SNMP as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> set setup services

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  PLEASE NOTE:
  -----------
  * Further configuration may be required after enabling a service.

  * If services are disabled, the connection to the switch may be lost.

  * When enabling SSL, please verify that the date/time settings
    on this switch and the workstation from where the SSL connection
    will be started match, and then a new certificate may need to be
    created to ensure a secure connection to this switch.

  TelnetEnabled       (True / False)   [True ]
  SSHEnabled          (True / False)   [False]
  GUIMgmtEnabled      (True / False)   [True ]
  SSLEnabled          (True / False)   [False]
  EmbeddedGUIEnabled  (True / False)   [True ]
  SNMPEnabled         (True / False)   [True ]
  NTPEnabled          (True / False)   [False]
  CIMEnabled          (True / False)   [False]
  FTPEnabled          (True / False)   [True ]
  MgmtServerEnabled   (True / False)   [True ]
  CallHomeEnabled     (True / False)   [True ]

  Do you want to save and activate this services setup? (y/n): [n]
```

You can display the SNMPEnabled parameters using the Show Setup Snmp or Show Setup Services commands.

Displaying SNMP Information

Enter the Show Setup Snmp command to displays common and trap-specific SNMP configuration information as shown in the following example. Refer to Table 14-30 for a description of the SNMP parameters.

```
SANbox #> show setup snmp
  SNMP Information
  ----------------
  SNMPEnabled           True
  Contact               <sysContact undefined>
  Location              N_107 System Test Lab
  Description           SANbox 5802V FC Switch
  ObjectID              1.3.6.1.4.1.3873.1.9
  AuthFailureTrap       True
  ProxyEnabled          True
  SNMPv3Enabled         False
  Trap1Address          10.0.0.254
  Trap1Port             162
  Trap1Severity         warning
  Trap1Version          2
  Trap1Enabled          False
  Trap2Address          0.0.0.0
  Trap2Port             162
  Trap2Severity         warning
  Trap2Version          2
  Trap2Enabled          False
  Trap3Address          0.0.0.0
  Trap3Port             162
  Trap3Severity         warning
  Trap3Version          2
  Trap3Enabled          False
  Trap4Address          0.0.0.0
  Trap4Port             162
  Trap4Severity         warning
  Trap4Version          2
  Trap4Enabled          False
  Trap5Address          0.0.0.0
  Trap5Port             162
  Trap5Severity         warning
  Trap5Version          2
  Trap5Enabled          False
```

Modifying the SNMP Configuration

Enter the Set Setup SNMP command in an Admin session to configure SNMP on the switch. There are two groups of configuration parameters. One group is common to all traps. The second group is trap specific. You can configure both groups of parameters for all SNMP traps, or you can configure the common and trap-specific parameters separately. Refer to Table 14-30 for descriptions of the common and trap-specific SNMP parameters.

The following example configures the common SNMP trap configuration parameters:

```
SANbox (admin) #> set setup snmp common
A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    SnmpEnabled      True
    Contact          <sysContact undefined>
    Location         <sysLocation undefined>
    ReadCommunity    public
    WriteCommunity   private
    AuthFailureTrap  False
    ProxyEnabled     True
    SNMPv3Enabled    False

  New Value (press ENTER to not specify value, 'q' to quit):
    SnmpEnabled      (True / False)         :
    Contact          (string, max=64 chars) :
    Location         (string, max=64 chars) :
    ReadCommunity    (string, max=32 chars) :
    WriteCommunity   (string, max=32 chars) :
    AuthFailureTrap  (True / False)         :
    ProxyEnabled     (True / False)         :
    SNMPv3Enabled    (True / False)         :

  Do you want to save and activate this snmp setup? (y/n): [n]
```

The following example configures SNMP trap 1:

```
SANbox (admin) #> set setup snmp trap 1
A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    Trap1Enabled    True
    Trap1Address    10.20.33.181
    Trap1Port       5001
    Trap1Severity   info
    Trap1Version    2
    Trap1Community  northdakota

  New Value (press ENTER to not specify value, 'q' to quit):
    Trap1Enabled    (True / False)                    :
    Trap1Address    (hostname, IPv4, or IPv6 Address) :
    Trap1Port       (decimal value, 1-65535)          :
    Trap1Severity   (select a severity level)
                    1=unknown     6=warning
                    2=emergency   7=notify
                    3=alert       8=info
                    4=critical    9=debug
                    5=error       10=mark             :
    Trap1Version    (1 / 2)                           :
    Trap1Community  (string, max=32 chars)            :

  Do you want to save and activate this snmp setup? (y/n): [n]
```

Resetting the SNMP Configuration

Enter the Reset SNMP command in an Admin session to reset the SNMP configuration back to the factory defaults as shown in the following example. Refer to Table 14-14 for a listing of the SNMP configuration factory defaults.

```
SANbox (admin) #> reset snmp
```

Managing the SNMP Version 3 Configuration

SNMP version 3 is an interoperable standards-based protocol for network management. SNMP version 3 provides secure access to devices by a combination of packet authentication and encryption over the network. SNMP version 3 provides the following security features:

- Message integrity—ensures that packets have not been altered
- Authentication—ensures that the packet is coming from a valid source
- Encryption—ensures that packet contents cannot be read by an unauthorized source

To configure SNMP version 3, you must enable SNMP version 3 on the switch and create one or more SNMP version 3 user accounts. To enable SNMP version 3, enter the Set Setup SNMP Common command and set the SNMPv3Enabled parameter to True:

```
SANbox #> admin start
SANbox (admin) #> set setup snmp common
A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    SnmpEnabled      True
    Contact          <sysContact undefined>
    Location         <sysLocation undefined>
    ReadCommunity    public
    WriteCommunity   private
    AuthFailureTrap  False
    ProxyEnabled     True
    SNMPv3Enabled    False

  New Value (press ENTER to not specify value, 'q' to quit):
    SnmpEnabled      (True / False)         :
    Contact          (string, max=64 chars) :
    Location         (string, max=64 chars) :
    ReadCommunity    (string, max=32 chars) :
    WriteCommunity   (string, max=32 chars) :
    AuthFailureTrap  (True / False)         :
    ProxyEnabled     (True / False)         :
    SNMPv3Enabled    (True / False)         : t

  Do you want to save and activate this snmp setup? (y/n): [n] y
```

Create an SNMP Version 3 User Account

To create an SNMP version 3 user account, enter the Snmpv3user Add command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> snmpv3user add

     A list of SNMPV3 user attributes with formatting and default values as
     applicable will follow.

     Enter a new value OR simply press the ENTER key where-ever allowed to
     accept the default value.

     If you wish to terminate this process before reaching the end of the list,
     press "q" or "Q" and the ENTER OR "Ctrl-C" key to do so.

  Username        (8-32 chars)                          : snmpuser1
  Group           (0=ReadOnly, 1=ReadWrite) [ReadOnly  ] : 1
  Authentication  (True/False)              [False     ] : t
  AuthType        (1=MD5, 2=SHA)            [MD5       ] : 1
  AuthPhrase      (8-32 chars)                          : ***********
  Confirm AuthPhrase                                    : ***********
  Privacy         (True/False)              [False     ] : t
  PrivType        (1=DES)                   [DES       ] : 1
  PrivPhrase      (8-32 chars)                          : ********
  Confirm PrivPhrase                                    : ********

  Do you want to save and activate this snmpv3user setup ?   (y/n): [n] y

  SNMPV3 user added and activated.
```

Display SNMP Version 3 User Accounts

To display SNMP version 3 user accounts, enter the Snmpv3user List command as shown in the following example:

```
SANbox #> snmpv3user list

  Username                          Group           AuthType   PrivType
  --------                          -----           --------   --------
  snmpuser1                         ReadWrite       MD5        DES
```

Modify an SNMP Version 3 User Account

To modify an SNMP version 3 user account, enter the Snmpv3user Edit command as shown in the following example:

```
SANbox #> admin start
SANbox (admin) #> snmpv3user edit

     A list of SNMPV3 user attributes with formatting and current attribute
     values for the specified SNMPV3 user will follow.

     Enter a new value OR simply press the ENTER key where-ever allowed to
     accept the current value.

     If you wish to terminate this process before reaching the end of the list,
     press "q" or "Q" and the ENTER OR "Ctrl-C" key to do so.

  Username        (8-32 chars)                          : snmpuser1
  Group           (0=ReadOnly, 1=ReadWrite) [ReadWrite ] : 1
  Authentication  (True/False)              [True      ] : f

  Do you want to save and activate this setup ?   (y/n): [n] n

  SNMPV3 user account edited and activated.
```

14 Command Reference

This section describes the commands of the CLI and the format in which they are presented. The command format presents the following:

- Access Authority
- Syntax and Keywords
- Notes and Examples
- Command Listing

Access Authority

The **Authority** paragraph in each command description indicates what types of sessions are required to enter that command. Commands associated with monitoring tasks are available to all account names with no special session requirement. Commands associated with configuration tasks are available only within an Admin session. An account must have Admin authority to enter the Admin Start command, which opens an Admin session.

Some commands require that you open additional editing sessions within an Admin session such as the following:

- Commands that modify zoning require a Zoning Edit session, which is opened by the Zoning Edit command. These commands include the Alias, Zone, Zoneset, and Zoning commands.
- Commands that modify device security require a Security Edit session, which is opened by the Security Edit command. These commands include the Group, Security, and Securityset commands.
- Commands that modify the switch configuration require a Config Edit session, which is opened by the Config Edit command. These commands include all of the Set Config commands.
- Commands that modify the Call Home e-mail notification configuration require a Callhome Edit session, which is opened by the Callhome Edit command. These commands include the Callhome, Capture, and Profile commands.

- Commands that modify the Internet Protocol Security configuration require an Ipsec Edit session, which is opened by the Ipsec Edit command. These commands include the Ipsec, Ipsec Association and Ipsec Policy commands.

Syntax and Keywords

The **Syntax** paragraph defines the command syntax using the following convention:

command
keyword
keyword *[value]*
keyword [value1] [value2]

The **Command** is followed by one or more keywords. Consider the following rules and conventions:

- Commands and keywords are case insensitive.
- Required keyword values appear in standard font: [value]. Optional values are shown in italics: *[value].*
- Underlined portions of the keyword in the command format indicate the abbreviated form that can be used. For example, the **delete** keyword can be abbreviated **del**.

The **Keywords** paragraph lists and describes each keyword and any applicable values.

Notes and Examples

The **Notes** paragraph presents useful information about the command and its use, including special applications or effects on other commands. The **Examples** paragraph presents sample screen captures of the command and its output.

Command Listing

The commands are listed in alphabetical order.

Admin

Opens and closes an Admin session. The Admin session provides access to commands that change the fabric and switch configurations. Only one Admin session can be open on the switch at any time. An inactive Admin session will time out after a period of time which can be changed using the Set Setup System command.

Authority User account with Admin authority

Syntax **admin**

start (or begin)
end (or stop)
cancel

Keywords **start (or begin)**
Opens the Admin session

end (or stop)
Closes the Admin session. The Hardreset, Hotreset, Quit, Shutdown, and Reset Switch commands will also end an Admin session.

cancel
Terminates an Admin session opened by another user. Use this keyword with care because it terminates the Admin session without warning the other user and without saving pending changes.

Notes Closing a Telnet window during an Admin session does not release the session. In this case, you must either wait for the Admin session to time out, or use the Admin Cancel command.

Examples The following example shows how to open and close an Admin session:

```
SANbox #> admin start
SANbox (admin) #>
.
.
.
SANbox (admin) #> admin end
```

Alias

Creates a named set of ports/devices. Aliases make it easier to assign a set of ports/devices to many zones. An alias can not have a zone or another alias as a member.

Authority Admin session and Zoning Edit session for all keywords except List and Members

Syntax **alias**

add [alias] [member_list]
copy [alias_source] [alias_destination]
create [alias]
delete [alias]
list
members [alias]
remove [alias] [member_list]
rename [alias_old] [alias_new]

Keywords **add [alias] [member_list]**

Specifies one or more ports/devices given by [member_list] to add to the alias named [alias]. Use a <space> to delimit ports/devices in [member_list]. An alias can have a maximum of 2000 members. A port/device in [member_list] can have any of the following formats:

- Domain ID and port number pair (Domain ID, Port Number). Domain IDs can be 1–239; port numbers can be 0–255.
- 6-character hexadecimal device Fibre Channel address (hex)
- 16-character hexadecimal worldwide port name (WWPN) with the format xx:xx:xx:xx:xx:xx:xx:xx.

The application verifies that the [alias] format is correct, but does not validate that such a port/device exists.

copy [alias_source] [alias_destination]

Creates a new alias named [alias_destination] and copies the membership into it from the alias given by [alias_source].

create [alias]

Creates an alias with the name given by [alias]. An alias name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The zoning database supports a maximum of 256 aliases.

delete [alias]

Deletes the specified alias given by [alias] from the zoning database. If the alias is a member of the active zone set, the alias will not be removed from the active zone set until the active zone set is deactivated.

list

Displays a list of all aliases. This keyword does not require an Admin session.

members [alias]

Displays all members of the alias given by [alias]. This keyword does not require an Admin session.

remove [alias] [member_list]

Removes the ports/devices given by [member_list] from the alias given by [alias]. Use a <space> to delimit ports/devices in [member_list]. A port/device in [member_list] can have any of the following formats:

- Domain ID and port number pair (Domain ID, Port Number). Domain IDs can be 1–239; port numbers can be 0–255.
- 6-character hexadecimal device Fibre Channel address (hex)
- 16-character hexadecimal worldwide port name (WWPN) for the device with the format xx:xx:xx:xx:xx:xx:xx:xx.

rename [alias_old] [alias_new]

Renames the alias given by [alias_old] to the alias given by [alias_new].

Examples

The following is an example of the Alias List command:

```
SANbox #> alias list

  Current list of Zone Aliases
  ----------------------------
  alias1
  alias2
```

The following is an example of the Alias Members command:

```
SANbox #> alias members alias1

  Current list of members for Zone Alias: alias1
  --------------------------------------
  50:06:04:82:bf:d2:18:c4
  50:06:04:82:bf:d2:18:c5
  50:06:04:82:bf:d2:18:c6
```

Callhome

Manages the Call Home database. The Callhome Edit command opens a session in which to create and manage Call Home profiles. Refer to the Profile command for more information about Call Home profiles.

Authority

Admin session except for the History and List keywords. The Clear keyword also requires a Callhome Edit session.

Syntax

callhome

cancel
changeover
clear
edit
history
list *profile [profile]*
queue [option]
save
test profile [profile]

Keywords

cancel

Closes the current Callhome Edit session. Any unsaved changes are lost.

changeover

Toggles activation between the primary SMTP server and the secondary SMTP server. Though the active server status changes, the primary SMTP server remains the primary, and the secondary SMTP server remains the secondary.

clear

Clears all Call Home profile information from the volatile edit copy of the Call Home database. This keyword requires a Callhome Edit session. This keyword does not affect the non-volatile Call Home database. However, if you enter the Callhome Clear command followed by the Callhome Save command, the non-volatile Call Home database will be cleared from the switch.

NOTE:

The preferred method for clearing the Call Home database from the switch is the Reset Callhome command.

edit

Open a Callhome Edit session. Callhome Edit session commands include Callhome Clear and all Profile commands.

history

Displays a history of Call Home modifications. This keyword does not require an Admin session. History information includes the following:

- Time of the most recent Call Home database modification and the user who performed it.
- Checksum for the Call Home database
- Profile processing information

list *profile [profile]*

Lists the configuration for the profile given by [profile]. If you omit [profile], the command lists all profiles and their configurations. If you omit the profile keyword, the command lists the profile names.

queue [*option*]

Clears the Call Home e-mail queue or displays Call Home e-mail queue statistics depending on the value of [*option*]. [*option*] can be one of the following:

clear
Clears the Call Home e-mail queue.

stats
Displays Call Home e-mail queue statistics. Statistics include the number of e-mail messages in the queue and the amount of file system space in use.

save

Saves changes made during the current Callhome Edit session.

test profile [profile]

Tests the Call Home profile given by [profile].

Examples

The following is an example of the Callhome History command:

```
SANbox #> callhome history
   CallHome Database History
   -------------------------
   ConfigurationLastEditedBy        admin@OB-session2
   ConfigurationLastEditedOn        day mmm dd hh:mm:ss yyyy
   DatabaseChecksum                 000014a3
   ProfileName                      group4
   ProfileLevel                     Warn
   ProcessedCount                   286
   ProcessedLast                    day mmm dd hh:mm:ss yyyy
   ProfileName                      group5
   ProfileLevel                     Alarm
   ProcessedCount                   25
   ProcessedLast                    day mmm dd hh:mm:ss yyyy
```

The following is an example of the Callhome List command:

```
SANbox #> callhome list

 Configured Profiles:
 --------------------
 group4
 group5
```

The following is an example of the Callhome List Profile command:

```
SANbox #> callhome list profile

ProfileName: group4
------------
Level             Warn
Format            FullText
MaxSize           any size up to max of 100000
EmailSubject      CallHome Warn
RecipientEmail    admin1@company.com
RecipientEmail    admin2@company.com
RecipientEmail    admin3@company.com
RecipientEmail    admin7@company.com
RecipientEmail    admin8@company.com
RecipientEmail    admin9@company.com
RecipientEmail    admin10@company.com

ProfileName:      group5
------------
Level             Alarm
Format            ShortText
MaxSize           any size up to max of 40000
EmailSubject      CallHome Alarm
RecipientEmail    me1@company.com
RecipientEmail    me10@company.com
```

The following is an example of the Callhome Test Profile command:

```
SANbox #> admin start
SANbox (admin) #> callhome test profile group4
  A callhome profile test has been started.
  A notification with the test result will appear
  on the screen when the test has completed.
SANbox (admin) #>
  Test for Callhome Profile group4 Passed.
```

The following is an example of the Callhome Queue Clear command:

```
SANbox #> admin start
SANbox (admin) #> callhome queue clear
  The callhome queue will be cleared. Please confirm (y/n): [n] y
```

The following is an example of the Callhome Queue Stats command:

```
SANbox #> callhome queue stats
  Callhome Queue Information
  --------------------------
  FileSystemSpaceInUse        534 (bytes)
  EntriesInQueue                3
```

Capture

Manages the data capture configuration for the Tech_Support_Center Call Home profile. The data capture configuration determines the time and frequency by which status and trend data is collected from the switch and sent to recipients specified in the Tech_Support_Center profile.

Authority Admin session and a Callhome Edit session. Refer to the “Callhome” command on page 14-6 for information about starting a Callhome Edit session.

Syntax

capture
- add
- edit
- remove

Keywords

add

Adds data capture instructions to the Tech_Support_Center profile. Table 14-1 describes the data capture parameters.

Table 14-1. Data Capture Configuration Parameters

Parameters	Description
TimeOfDay	Time of day to send status and trend data to the Tech_Support_Center profile e-mail recipients. The format is hh:mm on a 24-hour clock. The default 02:00.
DayOfWeek	Day-of-the-week to send status and trend data to the Tech_Support_Center profile e-mail recipients. Values can be Sun, Mon, Tue, Wed, Thur, Fri, Sat. The default is Sat.
Interval	Number of weeks between capture data e-mails to the Tech_Support_Center profile e-mail recipients. Values can be 1–26. The default is 1.

edit

Opens an edit session in which to modify the data capture configuration of the Tech_Support_Center profile. Refer to Table 14-1 for a description of the data capture configuration parameters.

remove

Removes the data capture configuration from the Test_Support_Center profile.

Examples

The following is an example of the Capture Add command:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> capture add
  A list of attributes with formatting and default values will follow.
  Enter a value or simply press the ENTER key to accept the default value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Value (press ENTER to accept the default, 'q' to quit):
    TimeOfDay  (HH:MM)                       [02:00]
    DayOfWeek  (Sun,Mon,Tue,Wed,Thu,Fri,Sat)  [Sat  ]
    Interval   (decimal value, 1-26 weeks)    [1    ]

  A capture entry has been added to profile Tech_Support_Center.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.
```

The following is an example of the Capture Edit command:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> capture edit
Capture Entries for Profile:  Tech_Support_Center

  Index  TimeOfDay  DayOfWeek  Interval
  -----  ---------  ---------  --------
  1      02:00      Sat        1 (weeks)

Please select a capture entry from the list above ('q' to quit): 1

  A list of attributes with formatting and current values will follow.
  Enter a value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Value (press ENTER to accept the default, 'q' to quit):
    TimeOfDay  (HH:MM)                       [02:00]
    DayOfWeek  (Sun,Mon,Tue,Wed,Thu,Fri,Sat)  [Sat  ]
    Interval   (decimal value, 1-26 weeks)    [1    ]

  The selected capture entry has been edited for profile Tech_Support_Center.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.
```

The following is an example of the Capture Remove command:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> capture remove
Capture Entries for Profile:  Tech_Support_Center

  Index  TimeOfDay  DayOfWeek  Interval
  -----  ---------  ---------  --------
  1      02:00      Sat        1 (weeks)

  Please select a capture entry from the list above ('q' to quit): 1

  The selected capture entry has been removed from profile Tech_Support_Center.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.
```

Config

Manages the Fibre Channel configurations on a switch. For information about setting the port and switch configurations, refer to the "Set Config Switch" command on page 14-95.

Authority Admin session for all keywords except Backup and List

Syntax

config
activate *[config_name]*
backup *export*
cancel
copy [config_source] [config_destination]
delete [config_name]
edit *[config_name]*
export [account_name] [ip_address] [file_name]
import [account_name] [ip_address] [file_name]
list
restore *import*
save *[config_name]*

Keywords

activate *[config_name]*

Activates the configuration given by [config_name]. If you omit [config_name], the currently active configuration is used. Only one configuration can be active at a time.

backup *export*

Creates a file named *configdata*, which contains the system configuration information. This keyword does not require an Admin session. Configuration backup files are deleted from the switch during a power cycle or switch reset.

The optional Export keyword creates the configuration backup file and exports it to a remote server prompting you for the server, an account name, the server IP address or DNS host name, destination file name, and a password if the server requires one.

cancel

Terminates the current configuration edit session without saving changes that were made.

copy [config_source] [config_destination]

Copies the configuration given by [config_source] to the configuration given by [config_destination]. The switch supports up to 10 configurations including the default configuration.

delete [config_name]

Deletes the configuration given by [config_name] from the switch. You cannot delete the default configuration (Default Config) nor the active configuration.

edit *[config_name]*

Opens an edit session for the configuration given by [config_name]. If you omit [config_name], the currently active configuration is used.

export [account_name] [ip_address] [file_name]

Exports an existing backup configuration file (*configdata*) from the switch to a remote server. The server IP address and corresponding user account are given by [ip_address] and [account_name] respectively. [ip_address] can be an IP address (version 4 or 6) or a DNS host name. The file name on the remote server is given by [file_name]. The system will prompt for a password if the server requires one.

import [account_name] [ip_address] [file_name]

Imports a backup configuration file given by [file_name] from a remote server to the switch. The server IP address and corresponding user account are given by [ip_address] and [account_name] respectively. [ip_address] can be an IP address (version 4 or 6) or a DNS host name. The file name on the remote server is given by [file_name]. The system will prompt for a password if the server requires one. You must enter the Config Restore command to apply the configuration to the switch.

list

Displays a list of all available configurations on the switch. This keyword does not require an Admin session.

restore *import*

Restores configuration settings to an out-of-band switch from a backup file named *configdata*, which must be first uploaded on the switch using FTP. You create the backup file using the Config Backup command. Use FTP to load the backup file on a switch, then enter the Config Restore command. After the restore is complete, the switch automatically resets.

The optional Import keyword imports the backup file from a remote server prompting you for an account name, server IP address or DNS host name, configuration file name on the server, and a password if the server requires one. When the upload is complete, the switch restores the configuration.

Refer to “Backing Up and Restoring a Switch Configuration” on page 5-14.

NOTE:

- If the restore process changes the IP address, use the Set Setup System command to return the IP configuration to the values you want. If the IP address is unknown, you must place the switch in maintenance mode and reset the network configuration to restore the default IP address 10.0.0.1. Refer to the installation guide for information about using maintenance mode.
- Configuration archive files created with the Enterprise Fabric Suite 2007 Archive function are not compatible with the Config Restore command.
- The *configdata* backup file does not include the security group primary or secondary secrets, and therefore are not restored. You must edit the security database and reconfigure the secrets. If they are not, the switch will isolate from the fabric.

save *[config_name]*

Saves changes made during a configuration edit session in the configuration given by [config_name]. If you omit [config_name], the value for [config_name] you chose for the most recent Config Edit command is used. [config_name] can be up to 31 characters excluding #, semicolon (;), and comma (,). The switch supports up to 10 configurations including the default configuration.

Notes

Changes you make to an active or inactive configuration can be saved, but will not take effect until you activate that configuration.

Examples

The following shows an example of how to open and close a Config Edit session:

```
SANbox #> admin start
SANbox (admin) #> config edit
   The config named default is being edited.
.
.
SANbox (admin-config) #> config cancel
  Configuration mode will be canceled. Please confirm (y/n): [n] y
SANbox (admin) #> admin end
```

The following is an example of how to create a backup file (configdata) and download the file to the workstation.

```
SANbox #> config backup
SANbox #> exit

#>ftp symbolic_name or ip_address
user: images
password: images
ftp> bin
ftp> get configdata
ftp> quit
```

The following is an example of how to upload a configuration backup file (configdata) from the workstation to the switch, and then restore the configuration.

```
#> ftp symbolic_name or ip_address
user: images
password: images
ftp> bin
ftp> put configdata
ftp> quit

SANbox #> admin start
SANbox (admin) #> config restore
The switch will be reset after restoring the configuration.
  Please confirm (y/n): [n] y
  Alarm Msg: [day month date time year][A1005.0021][SM][Configuration is being
restored -  this could take several minutes]
  Alarm Msg: [day month date time year][A1000.000A][SM][The switch will be reset in
3 seconds due to a config restore]
SANbox (admin) #>
  Alarm Msg: [day month date time year][A1000.0005][SM][The switch is being reset]
```

Create

Creates support files for troubleshooting switch problems, and certificates for secure communications for Enterprise Fabric Suite 2007 and SMI-S.

Authority Admin session for the Certificate keyword

Syntax **create**

certificate

support

Keywords **certificate**

Creates a security certificate on the switch. The security certificate is required to establish an SSL connection with a management application such as Enterprise Fabric Suite 2007. The certificate is valid 24 hours before the certificate creation date and expires 365 days after the creation date. Should the current certificate become invalid, use the Create Certificate command to create a new one.

NOTE:

To insure the creation of a valid certificate, be sure that the switch and the workstation time and date are the same. Refer to the following commands:

- “Date” command on page 14-20 for information about setting the time and date
- “Set Timezone” command on page 14-132 for information about setting the time zone on the switch and workstation
- “Set Setup System” command on page 14-123 (System keyword) for information about enabling the Network Time Protocol for synchronizing the time and date on the switch and workstation from an NTP server.

support

Assembles all log files and switch memory data into a file (dump_support.tgz) on the switch. If your workstation has an FTP server, you can proceed with the command prompts to send the file from the switch to a remote host. Otherwise, you can use FTP to download the support file from the switch to your workstation. The support file is useful to technical support personnel for troubleshooting switch problems. Use this command when directed by your authorized maintenance provider. This keyword does not require an Admin session.

NOTE:

Support files are deleted from the switch during a power cycle or switch reset.

Examples

The following is an example of the Create Support command when an FTP server is available on the workstation:

```
SANbox #> create support
Log Msg:[Creating the support file - this will take several seconds]

FTP the dump support file to another machine? (y/n): y
Enter IPv4, IPv6 Address or hostname of remote computer: 10.20.33.130
Login name: johndoe
Enter remote directory name: bin/support
Would you like to continue downloading support file? (y/n) [n]: y
Connected to 10.20.33.130 (10.20.33.130).
220 localhost.localdomain FTP server (Version wu-2.6.1-18) ready.
331 Password required for johndoe.
Password:  xxxxxxx

230 User johndoe logged in.
cd bin/support
250 CWD command successful.
lcd /itasca/conf/images
Local directory now /itasca/conf/images
bin
200 Type set to I.
put dump_support.tgz
local: dump_support.tgz remote: dump_support.tgz
227 Entering Passive Mode (10,20,33,130,232,133)
150 Opening BINARY mode data connection for dump_support.tgz.
226 Transfer complete.
43430 bytes sent in 0.292 secs (1.5e+02 Kbytes/sec)
Remote system type is UNIX.
Using binary mode to transfer files.
221-You have transferred 43430 bytes in 1 files.
221-Total traffic for this session was 43888 bytes in 1 transfers.
221 Thank you for using the FTP service on localhost.localdomain.
```

The following is an example of the Create Support command to download the support file to your workstation. When prompted to send the support file to another machine, you decline, close the Telnet session, and open an FTP session on the switch and log in with the account name *images* and password *images*. You then use the Get FTP command to transfer the *dump_support.tgz* file in binary mode.

```
SANbox #> create support
SANbox (admin) #> create support
Log Msg:[Creating the support file - this will take several seconds]
FTP the dump support file to another machine? (y/n): n

SANbox (admin) #> quit
>ftp switch_ip_address
user:     images
password: images

ftp>bin
ftp>get dump_support.tgz
    xxxxx bytes sent in xx secs.
ftp> quit
```

The following is an example of the Create Certificate command:

```
SANbox (admin) #> create certificate
  The current date and time is day mon date hh:mm:ss UTC yyyy.
  This is the time used to stamp onto the certificate.
  Is the date and time correct? (y/n): [n] y
  Certificate generation successful.
```

Date

Displays or sets the system date and time. To set the date and time the information string must be provided in this format: MMDDhhmmCCYY. The new date and time takes effect immediately.

Authority Admin session except to display the date.

Syntax **date**
[MMDDhhmmCCYY]

Keywords ***[MMDDhhmmCCYY]***

Specifies the date – this requires an Admin session. If you omit [MMDDhhmmCCYY], the current date is displayed which does not require an Admin session.

Notes Network Time Protocol (NTP) must be disabled to set the time with the Date command. Enter the Set Setup System command to disable the NTPClientEnabled parameter.

When setting the date and time on a switch that is enabled for SSL connections, the switch time must be within 24 hours of the workstation time. Otherwise, the connection will fail.

Examples The following is an example of the Date command:

```
SANbox #> date
  Mon Apr 07 07:51:24 200x
```

Exit

Closes the Telnet session.

Authority None

Syntax **exit**

Notes You can also press Control-D to close the Telnet session.

Fcping

NOTE:

This command requires the SANdoctor license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Verifies a Fibre Channel connection with another switch or a device and reports status.

Authority None

Syntax **fcping destination [address]**
count [number]
timeout [seconds]

Keywords **[address]**

The address of the port or device with which to verify the Fibre Channel connection. [address] can have one of the following formats:

- 6-character hexadecimal device Fibre Channel address (hex). Enter addresses with or without the “0x” prefix.
- 16-character hexadecimal worldwide port name (WWPN) with the format xx:xx:xx:xx:xx:xx:xx:xx or xxxxxxxxxxxxxxxx.

count [number]

Number of times given by [number] to repeat the command. If you omit this keyword, the command is repeated once.

timeout [seconds]

Number of seconds given by [seconds] to wait for a response. If you omit this keyword, the switch waits 1 second for a response.

Examples The following is an example of the Fcping command:

```
SANbox #> fcping 970400 count 3
28 bytes from local switch to 0x970400 time = 10 usec
28 bytes from local switch to 0x970400 time = 11 usec
28 bytes from local switch to 0x970400 time = 119 usec
```

Fctrace

NOTE:

This command requires the SANdoctor license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Displays the path from an initiator device port in the fabric to a target device port in the same zone. To trace the path between two initiator ports, you must disable the I/O StreamGuard feature. Use the Set Config Port command to change the IOStreamGuard parameter.

Path information includes the following:

- Domain IDs
- Inbound port name and physical port number
- Outbound port name and physical port number

Authority None

Syntax **fctrace [port_source] [port_destination] *[hop_count]***

Keywords **[port_source]**

The Fibre Channel port from to begin the trace. [port_source] can have the following formats:

- 6-character hexadecimal device Fibre Channel address (hex). Enter addresses with or without the “0x” prefix.
- 16-character hexadecimal worldwide port name (WWPN) with the format xx:xx:xx:xx:xx:xx:xx:xx or xxxxxxxxxxxxxxxx.

[port_destination]

The Fibre Channel port at which to end the trace. [port_destination] can have the following formats:

- 6-character hexadecimal device Fibre Channel address (hex). Enter addresses with or without the “0x” prefix.
- 16-character hexadecimal worldwide port name (WWPN) with the format xx:xx:xx:xx:xx:xx:xx:xx or xxxxxxxxxxxxxxxx.

[hop_count]

Maximum number of hops before stopping the trace. If you omit [hop_count], 20 hops is used.

Examples

The following is an example of the Fctrace command:

```
SANbox#> fctrace 970400 970e00 hops 5

  36 bytes from 0x970400 to 0x970e00, 5 hops max

  Domain  Ingress Port WWN         Port  Egress Port WWN          Port
  ------  ----------------         ----  ---------------          ----
  97      20:04:00:c0:dd:02:cc:2e  4     20:0e:00:c0:dd:02:cc:2e  14
  97      20:0e:00:c0:dd:02:cc:2e  14    20:04:00:c0:dd:02:cc:2e  4
```

Feature

Adds license key features to the switch and displays the license key feature log. To order a license key, contact your switch distributor or your authorized reseller. Upgrading a switch is not disruptive, nor does it require a switch reset.

Authority Admin session for Add keyword only

Syntax **feature**

add [license_key]

log

Keywords **add [license_key]**

Adds the feature that corresponds to the value given by [license_key]. [license_key] is case insensitive.

log

Displays a list of installed license key features.

Notes The following license keys are available:

- Enterprise Fabric Suite 2007 is a workstation-based Java® application that provides a graphical user interface for fabric management. This includes Performance View which graphs port performance. Enterprise Fabric Suite 2007 comes with a free 30-day trial license.
- Fabric Security provides for Secure Socket Layer (SSL) and Secure Shell (SSH) connection security, device security using Challenge Handshake Authentication Protocol (CHAP), and remote authentication using a Remote Authentication Dial-In User Service (RADIUS) server.
- SANdoctor provides tools for Fibre Channel connection verification (Fcping command), Fibre Channel route tracing (Fctrace command), and transceiver diagnostic information (Show Media command).
- Port Activation enables additional Fibre Channel ports up to the 24-port maximum.

Examples The following is an example of the Feature Add command:

```
SANbox #> admin start
SANbox (admin) #> feature add 1-LCVXOWUNOJBE6
License upgrade to 24 ports

Do you want to continue with license upgrade procedure? (y/n): [n] y
Alarm Msg:[day mon date time year][A1005.0030][SM][Upgrading Licensed Ports to 24]
```

The following is an example of the Feature Log command:

```
SANbox #> feature log
  Mfg Feature Log:
  ----------------
  Switch Licensed for 8 ports
  Customer Feature Log:
  ---------------------
  1) day month date 19:39:24 year - Switch Licensed for 24 ports
  1-LCVXOWUNOJBE6
```

Firmware Install

Downloads firmware from a remote host to the switch, installs the firmware, then resets the switch to activate the firmware. This is disruptive. The command prompts you for the following:

- The file transfer protocol (FTP or TFTP)
- IP address or DNS host name of the remote host
- An account name and password on the remote host (FTP only)
- Pathname for the firmware image file

Authority Admin session

Syntax **firmware install**

Examples The following is an example of the Firmware Install command using FTP:

```
SANbox #> admin start
SANbox (admin) #> firmware install
  The switch will be reset.  This process will cause a disruption
  to I/O traffic.
  Continuing with this action will terminate all management sessions,
  including any Telnet sessions. When the firmware activation is complete,
  you may log in to the switch again.

  Do you want to continue? [y/n]: y
      Press 'q' and the ENTER key to abort this command.

  FTP or TFTP     : ftp
  User Account    : johndoe
  IP Address      : 10.0.0.254
  Source Filename : 7.4.00.xx_epc
  About to install image.  Do you want to continue? [y/n] y

Connected to 10.0.0.254 (10.0.0.254).
220 localhost.localdomain FTP server (Version wu-2.6.1-18) ready.
331 Password required for johndoe.
Password: xxxxxxxxx
230 User johndoe logged in.
bin
200 Type set to I.
verbose
Verbose mode off.
  This may take several seconds...
  The switch will now reset.
Connection closed by foreign host.
```

The following is an example of the Firmware Install command using TFTP:

```
SANbox #> admin start
SANbox (admin) #> firmware install
  The switch will be reset.  This process will cause a disruption
  to I/O traffic.
  Continuing with this action will terminate all management sessions,
  including any Telnet sessions. When the firmware activation is complete,
  you may log in to the switch again.

  Do you want to continue? [y/n]: y

      Press 'q' and the ENTER key to abort this command.

  FTP or TFTP     : tftp
  IP Address      : 10.0.0.254
  Source Filename : 7.4.xx.xx_epc
  About to install image.  Do you want to continue? [y/n] y

Connected to 10.0.0.254 (10.0.0.254).
220 localhost.localdomain FTP server (Version wu-2.6.1-18) ready.
bin
200 Type set to I.
verbose
Verbose mode off.
  This may take several seconds...
  The switch will now reset.
Connection closed by foreign host.
```

Group

NOTE:

This command requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Creates groups, manages membership within the group, and manages the membership of groups in security sets.

Authority

Admin session and a Security Edit session. Refer to the “Security” command on page 14-77 for information about starting a Security Edit session. The List, Members, Securitysets, and Type keywords are available without an Admin session.

Syntax

group

add [group]
copy [group_source] [group_destination]
create [group] *[type]*
delete [group]
edit [group] [member]
list
members [group]
remove [group] [member_list]
rename [group_old] [group_new]
securitysets [group]
type [group]

Keywords

add [group]

Initiates an editing session in which to specify a group member and its attributes for the existing group given by [group]. ISL, Port, and MS member attributes are described in Table 14-2, Table 14-3, and Table 14-4 respectively. The group name and group type attributes are read-only fields common to all three tables.

Table 14-2. ISL Group Member Attributes

Attribute	Description
Member	Worldwide name of the switch that would attach to the switch. A member cannot belong to more than one group.
Authentication	Enables (CHAP) or disables (None) authentication using the Challenge Handshake Authentication Protocol (CHAP). The default is None.
Primary Hash	The preferred hash function to use to decipher the encrypted Primary Secret sent by the ISL member. The hash functions are MD5 or SHA-1. If the ISL member does not support the Primary Hash, the switch will use the Secondary Hash.
Primary Secret	Hexadecimal string that is encrypted by the Primary Hash for authentication with the ISL group member. The string has the following lengths depending on the Primary Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte
Secondary Hash	Hash function to use to decipher the encrypted Secondary Secret sent by the ISL group member. Hash values are MD5 or SHA-1. The Secondary Hash is used when the Primary Hash is not available on the ISL group member. The Primary Hash and the Secondary Hash cannot be the same.
Secondary Secret	Hex string that is encrypted by the Secondary Hash and sent for authentication. The string has the following lengths, depending on the Secondary Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte
Binding	Domain ID of the switch to which to bind the ISL group member worldwide name. This option is available only if FabricBindingEnabled is set to True using the Set Config Security command. 0 (zero) specifies no binding.

Table 14-3. Port Group Member Attributes

Attribute	Description
Member	Worldwide port name (WWPN) for the N_Port device that would attach to the switch. A member cannot belong to more than one group. All loop device WWPNs must be included in the group, otherwise the switch port will be downed, and none of the devices will be able to log in.
Authentication	Enables (CHAP) or disables (None) authentication using the Challenge Handshake Authentication Protocol (CHAP). The default is None.
Primary Hash	The preferred hash function to use to decipher the encrypted Primary Secret sent by the Port group member. The hash functions are MD5 or SHA-1. If the Port group member does not support the Primary Hash, the switch will use the Secondary Hash.
Primary Secret	Hexadecimal string that is encrypted by the Primary Hash for authentication with the Port group member. The string has the following lengths depending on the Primary Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte
Secondary Hash	Hash function to use to decipher the encrypted Secondary Secret sent by the Port group member. Hash values are MD5 or SHA-1. The Secondary Hash is used when the Primary Hash is not available on the Port group member. The Primary Hash and the Secondary Hash cannot be the same.
Secondary Secret	Hex string that is encrypted by the Secondary Hash and sent for authentication. The string has the following lengths depending on the Secondary Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte

Table 14-4. MS Group Member Attributes

Attribute	Description
Member	Port worldwide name for the N_Port device that would attach to the switch.
CTAuthentication	Common Transport (CT) authentication. Enables (True) or disables (False) authentication for MS group members. The default is False.
Hash	The hash function to use to decipher the encrypted Secret sent by the MS group member. Hash values are MD5 or SHA-1.
Secret	Hexadecimal string that is encrypted by the Hash function for authentication with MS group members. The string has the following lengths depending on the Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte

copy [group_source] [group_destination]

Creates a new group named [group_destination] and copies the membership into the new group from the group given by [group_source].

create [group] *[type]*

Creates a group with the name given by [group] with the type given by [type]. A group name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The security database supports a maximum of 16 groups. If you omit [type], ISL is used. [type] can be one of the following:

isl

Configures security for attachments to other switches.

Port

Configures security for attachments to N_Port devices.

ms

Configures security for attachments to N_Port devices that are issuing management server commands.

edit [group] [member]

Initiates an editing session in which to change the attributes of a worldwide name given by [member] in a group given by [group]. Member attributes that can be changed are described in Table 14-5.

Table 14-5. Group Member Attributes

Attribute	Description
Authentication (ISL and Port Groups)	Enables (CHAP) or disables (None) authentication using the Challenge Handshake Authentication Protocol (CHAP).
CTAuthentication (MS Groups)	CT authentication. Enables (True) or disables (False) authentication for MS group members. The default is False.
Primary Hash (ISL and Port Groups)	The preferred hash function to use to decipher the encrypted Primary Secret sent by the member. The hash functions are MD5 or SHA-1. If the member does not support the Primary Hash, the switch will use the Secondary Hash.
Hash (MS Groups)	The hash function to use to decipher the encrypted Secret sent by the MS group member. Hash values are MD5 or SHA-1.
Primary Secret (ISL and Port Groups)	Hexadecimal string that is encrypted by the Primary Hash for authentication with the member. The string has the following lengths depending on the Primary Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte
Secondary Hash (ISL and Port Groups)	Hash function to use to decipher the encrypted Secondary Secret sent by the group member. Hash values are MD5 or SHA-1. The Secondary Hash is used when the Primary Hash is not available on the group member. The Primary Hash and the Secondary Hash cannot be the same.
Secondary Secret (ISL and Port Groups)	Hex string that is encrypted by the Secondary Hash and sent for authentication. The string has the following lengths depending on the Secondary Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte
Secret (MS Groups)	Hexadecimal string that is encrypted by the Hash function for authentication with MS group members. The string has the following lengths depending on the Hash function: ■ MD5 hash: 16-byte ■ SHA-1 hash: 20-byte

Table 14-5. Group Member Attributes (Continued)

Attribute	Description
Binding (ISL Groups)	Domain ID of the switch to which to bind the ISL group member worldwide name. This option is available only if FabricBindingEnabled is set to True using the Set Config Security command. 0 (zero) specifies no binding.

list

Displays a list of all groups and the security sets of which they are members. This keyword is available without an Admin session.

members [group]

Displays all members of the group given by [group]. This keyword is available without an Admin session.

remove [group] [member_list]

Remove the port/device worldwide name given by [member] from the group given by [group]. Use a <space> to delimit multiple member names in [member_list]

rename [group_old] [group_new]

Renames the group given by [group_old] to the group given by [group_new].

securitysets [group]

Displays the list of security sets of which the group given by [group] is a member. This keyword is available without an Admin session.

type [group]

Displays the group type for the group given by [group]. This keyword is available without an Admin session.

Notes

Primary and secondary secrets are not included in a switch configuration backup. Therefore, after restoring a switch configuration, you must re-enter the primary and secondary secrets. Otherwise, the switch will isolate because of an authentication failure.

Refer to the “Securityset” command on page 14-81 for information about managing groups in security sets.

Examples The following is an example of the Group Add command:

```
SANbox #> admin start
SANbox (admin) #> security edit
SANbox (admin-security) #> group add Group_1
  A list of attributes with formatting and default values will follow
  Enter a new value or simply press the ENTER key to accept the current value
  with exception of the Group Member WWN field which is mandatory.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.
  Group Name       Group_1
  Group Type       ISL
  Member          (WWN)                          [00:00:00:00:00:00:00:00] 10:00:00:c0:dd:00:90:a3
  Authentication  (None / Chap)                    [None                   ] chap
  PrimaryHash     (MD5 / SHA-1)                    [MD5                    ]
  PrimarySecret   (32 hex or 16 ASCII char value)  [                       ] 0123456789abcdef
  SecondaryHash   (MD5 / SHA-1 / None)             [None                   ]
  SecondarySecret (40 hex or 20 ASCII char value)  [                       ]
  Binding         (domain ID 1-239, 0=None)        [0                      ]

  Finished configuring attributes.
  To discard this configuration use the security cancel command.
```

The following is an example of the Group Edit command:

```
SANbox #> admin start
SANbox (admin) #> security edit
SANbox (admin-security) #> group edit G1 10:00:00:c0:dd:00:90:a3
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.
  Group Name        g1
  Group Type        ISL
  Group Member      10:00:00:c0:dd:00:90:a3
  Authentication    (None / Chap)                   [None]  chap
  PrimaryHash       (MD5 / SHA-1)                   [MD5 ]  sha-1
  PrimarySecret     (40 hex or 20 ASCII char value) [    ]  12345678901234567890
  SecondaryHash     (MD5 / SHA-1 / None)            [None]  md5
  SecondarySecret   (32 hex or 16 ASCII char value) [    ]  1234567890123456
  Binding           (domain ID 1-239, 0=None)       [3   ]

  Finished configuring attributes.
  To discard this configuration use the security cancel command.
```

The following is an example of the Group List command:

```
SANbox #> group list
  Group       SecuritySet
  -----       -----------
  group1 (ISL)
              alpha
  group2 (Port)
              alpha
```

The following is an example of the Group Members command:

```
SANbox #> group members group_1
  Current list of members for Group: group_1
  ---------------------------------
  10:00:00:c0:dd:00:71:ed
  10:00:00:c0:dd:00:72:45
  10:00:00:c0:dd:00:90:ef
  10:00:00:c0:dd:00:b8:b7
```

Hardreset

Resets the switch and performs a power-on self test (POST). This reset disrupts I/O traffic, activates the pending firmware, and clears the alarm log. To save the alarm log before resetting, refer to the “Set Log” on page 14-101.

Authority Admin session

Syntax **hardreset**

Notes To reset the switch without a power-on self test, refer to the “Reset” command on page 14-67.

To reset the switch without disrupting traffic, refer to the “Hotreset” command on page 14-40.

Help

Displays a brief description of the specified command, its keywords, and usage.

Authority None

Syntax **help *[command] [keyword]***

Keywords ***[command]***

Displays a summary of the command given by [command] and its keywords. If you omit [command], the system displays all available commands.

[keyword]

Displays a summary of the keyword given by [keyword] belonging to the command given by [command]. If you omit [keyword], the system displays the available keywords for the specified command.

all

Displays a list of all available commands (including command variations).

Examples The following is an example of the Help Config command:

```
SANbox #> help config
config CONFIG_OPTIONS
The config command operates on configurations.

  Usage: config   { activate | backup   | cancel   | copy     | delete   |
                    edit     | list     | restore  | save }
```

The following is an example of the Help Config Edit command:

```
SANbox #> help config edit
config edit [CONFIG_NAME]
This command initiates a configuration session and places the current session
into config edit mode.
If CONFIG_NAME is given and it exists, it gets edited; otherwise, it gets
created.  If it is not given, the currently active configuration is edited.

Admin mode is required for this command.

  Usage: config edit [CONFIG_NAME]
```

History

Displays a numbered list of the previously entered commands from which you can re-execute selected commands.

Authority None

Syntax **history**

Notes Use the History command to provide context for the ! command:

- Enter ![command_string] to re-execute the most recent command that matches [command_string].
- Enter ![line number] to re-execute the corresponding command from the History display
- Enter ![partial command string] to re-execute a command that matches the command string.
- Enter !! to re-execute the most recent command.

Examples The following is an example of the History command:

```
SANbox #> history
   1 show switch
   2 date
   3 help set
   4 history

SANbox #> !3
help set

set SET_OPTIONS
There are many attributes that can be set.
Type help with one of the following to get more information:

  Usage: set   { alarm     | beacon    | config    | log       | pagebreak |
                 port      | setup     | switch }
```

Hotreset

Resets the switch for the purpose of activating the pending firmware without disrupting traffic. This command terminates all management sessions, saves all configuration information, and clears the event log. After the pending firmware is activated, the configuration is recovered. This process may take a few minutes. To save the event log to a file before resetting, enter the Set Log Archive command.

Authority Admin session

Syntax **hotreset**

Notes

- To ensure a successful non-disruptive activation, you should first satisfy the following conditions:
  - No changes are being made to switches in the fabric including powering up, powering down, disconnecting or connecting ISLs, changing switch configurations, or installing firmware.
  - No port on the switch is in the diagnostic state.
  - No Zoning Edit sessions are open on the switch.
  - No changes are being made to attached devices, including powering up, powering down, disconnecting, connecting, and HBA configuration changes.
  - For a fabric in which one or more switches are running firmware prior to version 7.4, only one Enterprise Fabric Suite 2007 session can be open.
- Install firmware on one switch at a time in the fabric. If you are installing firmware on one switch, wait two minutes after the activation is complete before installing firmware on a second switch.
- Ports that change states during the non-disruptive activation, will be reset. When the non-disruptive activation is complete, Enterprise Fabric Suite 2007 and QuickTools sessions reconnect automatically. However, Telnet sessions must be restarted manually.
- This command clears the event log and all counters.

NOTE:

After upgrading firmware that includes changes to QuickTools, an open QuickTools session may indicate that the firmware is not supported. This means the new firmware is not supported by the previous QuickTools version. To correct this situation, close the QuickTools session and the browser window, then open a new QuickTools session.

Image

Manages and installs switch firmware.

Authority Admin session

Syntax **image**

cleanup
fetch [account_name] [ip_address] [file_source] [file_destination]
install
list
tftp [ip_address] [file_source] [file_destination]
unpack [file]

Keywords **cleanup**

Removes all firmware image files from the switch. All firmware image files are removed automatically each time the switch is reset.

fetch [account_name] [ip_address] [file_source] [file_destination]

Retrieves image file given by [file_source] using FTP and stores it on the switch with the file name given by [file_destination]. The image file is retrieved from the host IP address given by [ip_address]. [ip_address] can be an IP address (version 4 or 6) or a DNS host name. If an account name needs a password to access the FTP server, the system will prompt you for it.

install

Downloads firmware from a remote host to the switch, installs the firmware, then resets the switch to activate the firmware. This is disruptive. The command prompts you for the following:

- File transfer protocol (FTP or TFTP)
- IP address or DNS host name of the remote host
- An account name and password on the remote host (FTP only)
- Pathname for the firmware image file

list

Displays the list of image files that reside on the switch.

tftp [ip_address] [file_source] [file_destination]

Retrieves image file given by [file_source] using TFTP and stores it on the switch with the file name given by [file_destination]. The image file is retrieved from the host IP address given by [ip_address]. [ip_address] can be an IP address (version 4 or 6) or a DNS host name.

unpack [file]

Installs the firmware file given by [file]. After unpacking the file, a message appears confirming successful unpacking. The switch must be reset for the new firmware to take effect.

Notes

To provide consistent performance throughout the fabric, ensure that all switches are running the same version of firmware.

To install firmware when the management workstation has an FTP server, use the Image Install command or the Firmware Install command.

Examples

The following is an example of the Image Install command:

```
SANbox #> admin start
SANbox (admin) #> image install
  The switch will be reset.  This process will cause a disruption
  to I/O traffic.
  Continuing with this action will terminate all management sessions,
  including any Telnet sessions. When the firmware activation is complete,
  you may log in to the switch again.

  Do you want to continue? [y/n]: y
      Press 'q' and the ENTER key to abort this command.

  FTP or TFTP     : ftp
  User Account    : johndoe
  IP Address      : 10.0.0.254
  Source Filename : 7.4.00.xx_epc
  About to install image.  Do you want to continue? [y/n] y

Connected to 10.0.0.254 (10.0.0.254).
220 localhost.localdomain FTP server (Version wu-2.6.1-18) ready.
331 Password required for johndoe.
Password: xxxxxxxxx
230 User johndoe logged in.
bin
200 Type set to I.
verbose
Verbose mode off.
  This may take several seconds...
  The switch will now reset.
Connection closed by foreign host.
```

The following is an example of the Image Fetch and Image Unpack commands:

```
SANbox (admin) #> image fetch johndoe 10.0.0.254 7.4.00.11_epc
>ftp 10.0.0.254
user:johndoe
password: ********
ftp>bin
ftp>put 7.4.00.11_epc
ftp>quit
SANbox (admin) $>image list
SANbox (admin) $>image unpack 7.4.00.11_epc
Image unpack command result: Passed
```

Ipsec

Manages the IP Security database. The IP Security database consists of the Security Association database and the Security Policy database. The Ipsec Edit command opens a session in which to create and manage associations and policies.

Authority Admin session except for the History keyword. The Clear keyword also requires an Ipsec Edit session.

Syntax **ipsec**

cancel
clear
edit
history
limits
save

Keywords **cancel**

Closes the current Ipsec Edit session. Any unsaved changes are lost.

clear

Deletes all associations and policies from the from the volatile edit copy of the IP security configuration. This keyword requires an Ipsec Edit session. This keyword does not affect the non-volatile IP security configuration. However, if you enter the Ipsec Clear command followed by the Ipsec Save command, the non-volatile IP security configuration will be deleted from the switch.

NOTE:

The preferred method for deleting the IP security configuration from the switch is the Reset Ipsec command.

edit

Open an Ipsec Edit session in which to create and manage associations and policies. Ipsec Edit session commands include Ipsec Clear, Ipsec Association commands, and Ipsec Policy commands. This keyword requires an Admin session.

history

Displays a history of IP security modifications. This keyword does not require an Admin session. History information includes the following:

- Time of the most recent IP security database modification and the user who performed it

- Checksums for the active and inactive IP security databases

limits

Displays the maximum and current numbers of configured associations and policies. This keyword does not require an Admin session nor an Ipsec Edit session. However, in an Ipsec Edit session, this command displays the number of both configured associations and policies, plus those created in the edit session but not yet saved.

save

Saves changes made during the current Ipsec Edit session.

Examples

The following is an example of the Ipsec History command:

```
SANbox #> ipsec history

  IPsec Database History
  ----------------------
  ConfigurationLastEditedBy      johndoe@OB-session5
  ConfigurationLastEditedOn      Sat Mar  8 07:14:36 2008
  Active Database Checksum       00000144
  Inactive Database Checksum     00000385
```

The following is an example of the Ipsec Limits command:

```
SANbox #> ipsec limits

  Configured (saved) IPsec Information

  IPsec Attribute            Maximum  Current
  ---------------            -------  -------
  MaxConfiguredSAs               512        0
  MaxConfiguredSPs               128        0
```

Ipsec Association

Creates and manages associations in the Security Association database.

Authority Admin session and an Ipsec Edit session

Syntax **ipsec association**

copy [association_source] [association_destination]
create [association]
delete [association]
edit [association]
list [association]
rename [association_old] [association_new]

Keywords **copy [association_source] [association_destination]**

Creates a new association named [association_destination] and copies the configuration into it from the association given by [association_source]. [association_destination] must not begin with *DynamicSA_*, which is reserved for dynamic associations. You must enter the Ipsec Save command afterwards to save your changes.

create [association]

Creates an association with the name given by [association]. An association name must begin with a letter and be no longer than 32 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The Security Association database supports a maximum of 512 user-defined associations. You must enter the Ipsec Save command afterwards to save your changes.

Table 14-6. Association Configuration Parameters

Parameter	Description
Description	Description of the association.
SourceAddress	IP address (version 4 or 6) or DNS host name of the host, switch, or gateway from which data originates.
DestinationAddress	IP address (version 4 or 6) or DNS host name of the host, switch, or gateway receiving data. If you specified an IP address for the SourceAddress, the DestinationAddress must use the same IP version format.

Table 14-6. Association Configuration Parameters

Parameter	Description
Protocol	IP security protocol to be used to process data. The protocol can be one of the following: ■ Encapsulated Security Payload–RFC 2406 (esp) ■ Encapsulated Security Payload–RFC 1827 (esp-old) ■ Authentication Header– RFC 2402 (ah) ■ Authentication Header–RFC 1826 (ah-old)
SPI	Security parameters index number
Authentication	Algorithm to use to authenticate the source or destination. The authentication algorithm can be one of the following: ■ HMAC-MD5 ■ HMAC-SHA1 ■ HMAC-SHA256 ■ AES-XCBC-MAC
AuthenticationKey	Key string to use for authentication.
Encryption	Algorithm that encrypts outbound data or decrypt inbound data. The encryption algorithm can be one of the following: ■ DES-CBC ■ 3DES-CBC
EncryptionKey	Key string to use in encrypting or decrypting data.

delete [association]

Deletes the specified association given by [association] from the Security Association database. You must enter the Ipsec Save command afterwards to save your changes.

edit [association]

Opens an edit session in which to change the configuration of an existing association given by [association]. For descriptions of the association parameters, refer to Table 14-6. If the connection is not secure (SSH is disabled), the AuthenticationKey and EncryptionKey values are masked.

list *[option]*

Displays the configuration for the policies given by [option]. If you omit [option], the command displays the configuration of all active associations. [option] can be one of the following:

[association]

Displays the configuration for the association given by [association].

active

Displays the configuration for all active associations.

configured

Displays the configuration for all user-defined associations.

edited

Displays the configuration for all associations that have been modified, but not saved.

rename [association_old] [association_new]

Renames the association given by [association_old] to the association given by [association_new]. You must enter the Ipsec Save command afterwards to save your changes. Dynamic associations cannot be renamed. Dynamic associations cannot be renamed.

Examples The following is an example of the Ipsec Association Create command:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec association create h2h-sh-sa

  A list of attributes with formatting will follow.
  Enter a value or simply press the ENTER key to skip specifying a value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Required attributes are preceded by an asterisk.

  Value (press ENTER to not specify value, 'q' to quit):
    Description        (string value, 0-127 bytes)           :  Host-to-host: switch->host
   *SourceAddress      (hostname, IPv4, or IPv6 Address)     :  fe80::2c0:ddff:fe03:d4c1
   *DestinationAddress (hostname, IPv4, or IPv6 Address)     :  fe80::250:daff:feb7:9d02
   *Protocol           (1=esp, 2=esp-old, 3=ah, 4=ah-old)    :  1
   *SPI                (decimal value, 256-4294967295)       :  333
    Authentication     (select an authentication algorithm)
                          1=hmac-md5       (16 byte key)
                          2=hmac-sha1      (20 byte key)
                          3=hmac-sha256    (32 byte key)
                          4=aes-xcbc-mac   (16 byte key)
                       authentication algorithm choice       :  2
   *AuthenticationKey  (quoted string or raw hex bytes)      :  "12345678901234567890"
   *Encryption         (select an encryption algorithm)
                          1=des-cbc        (8 byte key)
                          2=3des-cbc       (24 byte key)
                          3=null           (0 byte key)
                          4=blowfish-cbc   (5-56 byte key)
                          5=aes-cbc        (16/24/32 byte key)
                          6=twofish-cbc    (16-32 byte key)
                       encryption algorithm choice           :  2
   *EncryptionKey      (quoted string or raw hex bytes)      :  "123456789012345678901234"

  The security association has been created.
  This configuration must be saved with the 'ipsec save' command
  before it can take effect, or to discard this configuration
  use the 'ipsec cancel' command.
```

Ipsec List

Displays information about IP security associations and policies.

Authority None

Syntax **ipsec list**

active
association *[option]*
configured
edited
policy *[option]*

Keywords **active**

Displays a summary of active associations and policies. This is the default.

association *[option]*

Displays the configuration for the associations given by [option]. If you omit [option], the command displays the configuration of all active associations. [option] can be one of the following:

[association]

Displays the configuration for the association given by [association].

active

Displays the configuration for all active associations.

configured

Displays the configuration for all user-defined associations.

edited

Displays the configuration for all associations that have been modified, but not saved.

configured

Displays a summary of the user-defined associations and policies.

edited

Displays a summary of the associations and policies that have been modified, but not saved.

policy *[option]*

Displays the configuration for the policies given by [option]. If you omit [option], the command displays the configuration of all active policies. [option] can be one of the following:

[policy]

Displays the configuration for the policy given by [policy].

active

Displays the configuration for all active policies.

configured

Displays the configuration for all user-defined policies.

edited

Displays the configuration for all policies that have been modified, but not saved.

Examples

The following is an example of the Ipsec List command:

```
SANbox #> ipsec list

  Active IPsec Information

  Security Association Database
  -----------------------------
  h2h-sh-sa
  h2h-hs-sa

  Security Policy Database
  ------------------------
  h2h-hs-sp
  h2h-sh-sp

  Summary
  -------
    Security Association Count:   2
    Security Policy Count:        2
```

The following is an example of the Ipsec List Association command:

```
SANbox #> ipsec list association

  Active IPsec Information

  h2h-sh-sa
    Description: Host-to-host: switch->host
    Source: fe80::2c0:ddff:fe03:d4c1
    Destination: fe80::250:daff:feb7:9d02
    Protocol: esp  SPI: 333 (0x14d)
    Authentication: hmac-sha1  ********
    Encryption: 3des-cbc  ********

  h2h-hs-sa
    Description: Host-to-host: host->switch
    Source: fe80::250:daff:feb7:9d02
    Destination: fe80::2c0:ddff:fe03:d4c1
    Protocol: esp  SPI: 444 (0x1bc)
    Authentication: hmac-sha1  ********
    Encryption: 3des-cbc  ********
```

The following is an example of the Ipsec List Policy command:

```
SANbox #> ipsec list policy

  Active IPsec Information

  h2h-hs-sp
    Description: Host-to-host: host->switch
    Source: fe80::250:daff:feb7:9d02/128
    Destination: fe80::2c0:ddff:fe03:d4c1/128
    Protocol: any
    Direction: in  Priority: 0  Action: ipsec

    Rule  Protocol  Mode       Level
    ----  --------  ---------  -----
    1     esp       transport  require

  h2h-sh-sp
    Description: Host-to-host: switch->host
    Source: fe80::2c0:ddff:fe03:d4c1/128
    Destination: fe80::250:daff:feb7:9d02/128
    Protocol: any
    Direction: out  Priority: 0  Action: ipsec

    Rule  Protocol  Mode       Level
    ----  --------  ---------  -----
    1     esp       transport  require
```

Ipsec Policy

Manages policies in the Security Policy database.

Authority Admin session and an Ipsec Edit session

Syntax **ipsec policy**

copy [policy_source] [policy_destination]
create [policy]
delete [policy]
edit [policy]
list *[option]*
rename [policy_old] [policy_new]

Keywords **copy [policy_source] [policy_destination]**

Creates a new policy named [policy_destination] and copies the configuration into it from the policy given by [policy_source]. You must enter the Ipsec Save command afterwards to save your changes. [policy_destination] must not begin with *DynamicSP_*, which is reserved for dynamic policies.

create [policy]

Creates a policy with the name given by [policy]. A policy name must begin with a letter and be no longer than 32 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The Security Policy database supports a maximum of 128 user-defined policies. You must enter the Ipsec Save command afterwards to save your changes. Table 14-7 describes the policy parameters:

Table 14-7. Policy Configuration Parameters

Parameter	Description
Description	Description of the policy
SourceAddress	IP address (version 4 or 6) or DNS host name of the host, switch, or gateway from which data originates.
SourcePort	Source port number (1–65535)
DestinationAddress	IP address (version 4 or 6) or DNS host name of the host, switch, or gateway receiving data. If you specified an IP address for the SourceAddress, the DestinationAddress must use the same IP version format.
DestinationPort	Destination port number (1–65535)

Table 14-7. Policy Configuration Parameters

Parameter	Description
Protocol	Protocol or application to which to apply IP security. Enter a keyword for one of the following protocols or an integer (0-255): ■ Internet Control Message Protocol for IP version 4 (ICMP) ■ Internet Control Message Protocol for IP version 6 (ICMP6) ■ Internet Protocol, version 4 (IPv4) ■ Transmission Control Protocol (TCP) ■ User Datagram Protocol (UDP) ■ Any protocol
ICMP6	ICMP number (0–255). You are prompted for this parameter only if you specify ICMP6 for the Protocol parameter.
Direction	Direction of the data traffic to which to apply the policy: ■ In–Data entering the destination ■ Out–Data leaving the source
Priority	A number from -2147483647 to +214783647 that determines priority for this policy in the security policy database. The higher the number, the higher the priority.
Action	Processing to apply to data traffic: ■ Discard–Unconditionally disallow all inbound or outbound data traffic. ■ None–Allow all inbound or outbound data traffic without encryption or decryption. ■ Ipsec–Apply IP security to inbound and outbound data traffic.
ProtectionDesired	Type of IP security protection to apply: ■ AH–Authentication Header ■ ESP–Encapsulating Security Payload ■ Both–Apply both AH and ESP protection
ahRuleLevel	Rule level to apply for AH protection: ■ Default–use the system wide default for the protocol ■ Use–use a security association if one is available ■ Require–a security association is required whenever a packet is sent that is matched with the policy

Table 14-7. Policy Configuration Parameters

Parameter	Description
espRuleLevel	Rule level to apply for ESP protection: ■ Default–use the system wide default for the protocol ■ Use–use a security association if one is available ■ Require–a security association is required whenever a packet is sent that is matched with the policy

delete [policy]

Deletes the policy given by [policy] from the Security Policy database. You must enter the Ipsec Save command afterwards to save your changes.

edit [policy]

Opens an edit session in which to change the configuration of an existing policy given by [policy].

list *[option]*

Displays the configuration for the policies given by [option]. If you omit [option], the command displays the configuration of all active policies. [option] can be one of the following:

[policy]

Displays the configuration for the policy given by [policy].

active

Displays the configuration for all active policies.

configured

Displays the configuration for all user-defined policies.

edited

Displays the configuration for all policies that have been modified, but not saved.

rename [policy_old] [policy_new]

Renames the policy given by [policy_old] to the policy given by [policy_new]. You must enter the Ipsec Save command afterwards to save your changes. Dynamic policies cannot be renamed.

Examples The following is an example of the Ipsec Policy Create command:

```
SANbox #> admin start
SANbox (admin) #> ipsec edit
SANbox (admin-ipsec) #> ipsec policy create h2h-sh-sp

  A list of attributes with formatting will follow.
  Enter a value or simply press the ENTER key to skip specifying a value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Required attributes are preceded by an asterisk.

  Value (press ENTER to not specify value, 'q' to quit):
    Description       (string value, 0-127 bytes)                    :  Host-to-host: switch->host
   *SourceAddress     (hostname, IPv4, or IPv6 Address/[PrefixLength]):  fe80::2c0:ddff:fe03:d4c1
    SourcePort        (decimal value, 1-65535)                       :
   *DestinationAddress (hostname, IPv4, or IPv6 Address/[PrefixLength]):  fe80::250:daff:feb7:9d02
    DestinationPort   (decimal value, 1-65535)                       :
   *Protocol          (decimal value, or keyword)
                        Allowed keywords
                          icmp, icmp6, ip4, tcp, udp or any          :  any
   *Direction         (1=in, 2=out)                                  :  2
    Priority          (value, -2147483647 to +214783647)             :
   *Action            (1=discard, 2=none, 3=ipsec)                   :  3
   *ProtectionDesired  (select one, transport-mode only)
                        1=ah   Authentication Header
                        2=esp  Encapsulating Security Payload
                        3=both                                       :  2
   *espRuleLevel      (1=default, 2=use, 3=require)                  :  3

  The security policy has been created.
  This configuration must be saved with the 'ipsec save' command
  before it can take effect, or to discard this configuration
  use the 'ipsec cancel' command.
```

Lip

Reinitializes the specified loop port.

Authority Admin session

Syntax **lip [port_number]**

Keywords **[port_number]**

The number of the port to be reinitialized. Ports are numbered beginning with 0.

Examples The following is an example of the Lip command:

```
SANbox (admin) #> lip 2
```

Logout

Closes the Telnet session.

Authority None

Syntax **logout**

Notes You can also press Control-D to close the Telnet session.

Passwd

Changes a user account's password.

Authority Admin account name and an Admin session to change another account's password; you can change you own password without an Admin session.

Syntax **passwd [account_name]**

Keywords **[account_name]**

The user account name. To change the password for an account name other than your own, you must open an Admin session with the account name Admin. If you omit [account_name], you will be prompted to change the password for the current account name.

Examples The following is an example of the Passwd command:

```
SANbox #> admin start
SANbox (admin) #> passwd user2

     Press 'q' and the ENTER key to abort this command.

  account OLD password               : ********
  account NEW password (8-20 chars)  : ********

  please confirm account NEW password: ********
  password has been changed.
```

Ping

Initiates an attempt to communicate with another switch over an Ethernet network and reports the result.

Authority None

Syntax **ping**

[host_name]
-ipv4 [host_address]
-ipv6 [host_address]

Keywords **[host_name]**

DNS host name of the switch you want to query. [host_name] is a character string of 2–125 characters made up of one or more subdomains delimited by periods (.). The following naming rules apply:

- Valid characters are alphanumeric characters, period (.), and hyphen (-).
- Each subdomain must be a minimum of two alphanumeric characters.
- Each subdomain must start and end with an alphanumeric character.
- A host name can end with a period (.).

-ipv4 [host_address]

IP address (version 4) or DNS host name of the switch you want to query. Broadcast IP addresses, such as 255.255.255.255, are not valid.

-ipv6 [host_address]

IP address (version 6) or DNS host name of the switch you want to query.

Examples The following is an example of a successful Ping command:

```
SANbox #> ping 10.20.11.57
  Ping command issued. Waiting for response...
SANbox #>
  Response successfully received from 10.20.11.57.
```

This following is an example of an unsuccessful Ping command:

```
SANbox #> ping 10.20.11.57
  Ping command issued. Waiting for response...
  No response from 10.20.11.57. Unreachable.
```

Profile

Creates and modifies profiles with which to customize Call Home e-mail notification. A profile defines the event severity level at which to generate e-mails, e-mail subject and text, and e-mail recipients.

Authority Admin session and a Callhome Edit session. Refer to the "Callhome" command on page 14-6 for information about starting a Callhome Edit session.

Syntax

profile

copy [profile_source] [profile_destination]
create [profile]
delete [profile]
edit [profile]
rename [profile_old] [profile_new]

Keywords

copy [profile_source] [profile_destination]

Creates a new profile named [profile_destination] and copies the configuration into it from the profile given by [profile_source]. You must enter the Callhome Save command afterwards to save your changes. Neither [profile_source] nor [profile_destination] can be Tech_Support_Center.

create [profile]

Creates a profile with the name given by [profile]. A profile name must begin with a letter and be no longer than 32 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The Tech_Support_Center profile name is reserved. You must enter the Callhome Save command afterwards to save your changes. The Call Home database supports a maximum of 25 profiles. Table 14-8 describes the profile configuration parameters.

Table 14-8. Profile Configuration Parameters

Parameter	Description
Level	Event severity level at which to generate a Call Home e-mail message: ■ None–Generates e-mail messages for all events. ■ Warn–Generates e-mail messages for Warning, Critical, and Alarm events. ■ Critical–Generates e-mail messages for Critical and Alarm events. ■ Alarm–Generates e-mail messages for Alarm events only.

Table 14-8. Profile Configuration Parameters (Continued)

Parameter	Description
Format	Level of detail to be included in the e-mail message: ■ ShortText–includes switch and event information. ■ FullText–includes switch information, event information, Call Home contact information, and SNMP contact information. ■ Tsc1–includes switch and event information in a format intended for automated e-mail readers.
MaxSize	Maximum number of characters allowed in the e-mail message. Decreasing this parameter makes for easier reading on small display devices such as cell phones. The minimum is 650. The maximum and default is 100,000.
EmailSubject	E-mail subject of up to 64 characters
RecipientMail	Recipient e-mail addresses; maximum of 10 addresses. The format is *account@domain*.
CaptureEnabled	Enables (True) or disables (False) the data capture configuration only when creating the Tech_Support_Center profile. For more information about the data capture configuration, refer to the Capture command.

delete [profile]

Deletes the specified profile given by [profile] from the Call Home database. You must enter the Callhome Save command afterwards to save your changes.

edit [profile]

Opens an edit session in which to change the configuration of an existing profile given by [profile]. The Tech_Support_Center profile can be edited. For descriptions of the profile parameters, refer to Table 14-8. The CaptureEnabled parameter is displayed only when modifying the Tech_Support_Center profile.

rename [profile_old] [profile_new]

Renames the profile given by [profile_old] to the profile given by [profile_new]. You must enter the Callhome Save command afterwards to save your changes.

Examples

The following is an example of the Profile Create command:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile create profile_1
A list of attributes with formatting and default values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list
press 'q' or 'Q' and the ENTER key to do so.

Default Values:
  Level           Alarm
  Format          FullText
  MaxSize         100000
  EmailSubject    <undefined>
  RecipientEmail  (up to 10 entries allowed)

New Value (press ENTER to accept default value, 'q' to quit):
  Level           (Alarm,Critical,Warn,None)        :
  Format          (1=FullText, 2=ShortText, 3=Tsc1) :
  MaxSize         (decimal value, 650-100000)       :
  EmailSubject    (string, max=64 chars, N=None)    : Technical problem
  RecipientEmail  (ex: admin@company.com, N=None)
  1. <undefined>                                    : admin0@company.com

The profile has been created.
This configuration must be saved with the callhome save command
before it can take effect, or to discard this configuration
use the callhome cancel command.

SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

The following is an example of the Profile Edit command:

```
SANbox #> admin start
SANbox (admin) #> callhome edit
SANbox (admin-callhome) #> profile edit profile_1
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    Level           Alarm
    Format          ShortText
    MaxSize         1000
    EmailSubject    Switch Problem
    RecipientEmail  (up to 10 entries allowed)
    1. john.smith@domain.com

  New Value (press ENTER to accept current value, 'q' to quit):
    Level           (Alarm,Critical,Warn,None)        :
    Format          (1=FullText, 2=ShortText, 3=Tsc1) : 1
    MaxSize         (decimal value, 650-100000)       :
    EmailSubject    (string, max=64 chars, N=None)    :
    RecipientEmail  (ex: admin@company.com, N=None)
    1. john.smith@domain.com                          :
    2. <undefined>                                    :

  The profile has been edited.
  This configuration must be saved with the 'callhome save' command
  before it can take effect, or to discard this configuration
  use the 'callhome cancel' command.

SANbox (admin-callhome) #> callhome save
  The CallHome database profiles will be saved and activated.
  Please confirm (y/n): [n] y
```

Ps

Displays current system process information.

Authority None

Syntax **ps**

Examples The following is an example of the Ps command:

```
SANbox #> ps
  PID  PPID %CPU %MEM     TIME     ELAPSED COMMAND
  244   224  0.0  0.3 00:00:04  2-03:02:31 cns
  245   224  0.0  0.3 00:00:06  2-03:02:31 ens
  246   224  0.0  0.3 00:00:09  2-03:02:31 dlog
  247   224  0.0  0.6 00:00:33  2-03:02:31 ds
  248   224  0.3  2.8 00:09:59  2-03:02:31 mgmtApp
  249   224  0.0  0.3 00:00:16  2-03:02:31 sys2swlog
  251   224  0.0  0.4 00:00:06  2-03:02:30 fc2
  252   224  0.0  0.6 00:00:16  2-03:02:30 nserver
  253   224  0.0  0.8 00:00:08  2-03:02:30 PortApp
  254   224  0.0  0.5 00:00:03  2-03:02:30 qfsApp
  255   224  0.0  0.5 00:00:09  2-03:02:30 mserver
  256   224  0.0  0.7 00:00:06  2-03:02:30 eport
  257   224  0.0  0.6 00:00:13  2-03:02:30 zoning
  282   254  0.0  0.5 00:00:00  2-03:02:26 qfsApp
  284   224  0.0  0.6 00:00:08  2-03:02:26 snmpservicepath
  285   282  0.0  0.5 00:00:00  2-03:02:26 qfsApp
  308   224  0.0  0.8 00:00:29  2-03:02:25 cim_server
  322   224  0.0  0.7 00:00:16  2-03:02:24 util
  323   224  0.0  0.4 00:00:09  2-03:02:24 port_mon
  324   224  0.0  0.5 00:00:07  2-03:02:24 diagAgent
  325   224  0.0  0.4 00:00:03  2-03:02:24 diagExec
  289   224  0.0  0.4 00:00:00  2-03:02:25 snmpd
  290   224  0.0  0.5 00:00:00  2-03:02:25 snmpmain
  335   290  0.0  0.5 00:00:00  2-03:02:23 snmpmain
  336   335  0.0  0.5 00:00:00  2-03:02:23 snmpmain
```

Quit

Closes the Telnet session.

Authority None

Syntax **quit**

Notes You can also press Control-D to close the Telnet session.

Reset

Resets the switch configuration parameters. If you omit the keyword, the default is Reset Switch.

Authority Admin session

Syntax **reset**

callhome
config *[config_name]*
factory
ipsec
port [port_list]
radius
security
services
snmp
switch (default)
system
zoning

Keywords **callhome**

Resets the Call Home database configuration to its default values.

config *[config_name]*

Resets the configuration given by [config_name] to the factory default values for switch, port, port threshold alarm, and zoning configuration as described in Table 14-10 through Table 14-18. If [config_name] does not exist on the switch, a configuration with that name will be created. If you omit [config_name], the active configuration is reset. You must activate the configuration for the changes to take effect.

factory

Resets switch configuration, port configuration, port threshold alarm configuration, zoning configuration, SNMP configuration, system configuration, security configuration, RADIUS configuration, switch services configuration, zoning configuration, and Call Home configuration to the factory default values as described in Table 14-10 through Table 14-18. The switch configuration is activated automatically.

NOTE:

- Because this keyword changes network parameters, the workstation could lose communication with the switch and release the Admin session.
- This keyword does not affect installed license keys.

ipsec

Resets the IP security database configuration to its default values.

port [port_list]

Reinitializes one or more ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15.

radius

Resets the RADIUS configuration to the default values as described in Table 14-15.

security

Clears the security database and deactivates the active security set. The security configuration value, autosave, and fabric binding remain unchanged.

services

Resets the switch services configuration to the default values as described in Table 14-16.

snmp

Resets the SNMP configuration settings to the factory default values. Refer to Table 14-14 for SNMP configuration default values.

switch

Resets the switch without a power-on self test. This is the default. This reset disrupts traffic and does the following:

- Activates the pending firmware.
- Closes all management sessions.
- Clears the event log. To save the event log before resetting, refer to the "Set Log" command on page 14-101.

To reset the switch with a power-on self test, refer to the "Hardreset" command on page 14-37. To reset the switch without disrupting traffic, refer to the "Hotreset" command on page 14-40.

NOTE:

The following files are deleted from the switch during a switch reset:

- Firmware image files that have not been unpacked
- Configuration backup files
- Support files

system

Resets the system configuration settings to the factory default values as described in Table 14-17.

NOTE:

- Because this keyword changes network parameters, the workstation could lose communication with the switch.
- This keyword does not affect installed license keys.

zoning

Clears the zoning database and deactivates the active zone set. The zoning configuration parameters (MergeAutoSave, DefaultZone, DiscardInactive) remain unchanged. Refer to Table 14-13 for information about the zoning configuration parameters.

Notes

The following tables specify the various factory default settings:

- Table 14-9 shows the Call Home service configuration defaults. Enter the Show Setup Callhome command to display the Call Home service configuration values.
- Table 14-10 shows the switch configuration default values. Enter the Show Config Switch command to display switch configuration values.
- Table 14-11 shows the port configuration default values. Enter the Show Config Port command to display port configuration values.
- Table 14-12 shows the port threshold alarm configuration defaults. Enter the Show Config Threshold command to display port threshold alarm configuration values.
- Table 14-13 shows the zoning configuration defaults. Enter the Show Config Zoning command to display zoning configuration values.
- Table 14-14 shows the SNMP configuration defaults. Enter the Show Setup Snmp command to display SNMP configuration values.
- Table 14-15 shows the RADIUS configuration defaults. Enter the Show Setup Radius command to display RADIUS configuration values.
- Table 14-16 shows the switch services configuration defaults. Enter the Show Setup Services command to display switch services configuration values.
- Table 14-17 shows the system configuration defaults. Enter the Show Setup System command to display system configuration values.
- Table 14-18 shows the security configuration defaults. Enter the Show Config Security command to display security configuration values.

Table 14-9. Call Home Service Configuration Defaults

Parameters	Default
PrimarySMTPServerAddr	0.0.0.0
PrimarySMTPServerPort	25
PrimarySMTPServerEnabled	False
SecondarySMTPServerAddr	0.0.0.0
SecondarySMTPServerPort	25
SecondarySMTPServerEnabled	False
ContactEmailAddress	nobody@localhost.localdomain
PhoneNumber	<undefined>

Table 14-9. Call Home Service Configuration Defaults (Continued)

Parameters	Default
StreetAddress	<undefined>
FromEmailAddress	nobody@localhost.localdomain
ReplyToEmailAddress	nobody@localhost.localdomain
ThrottleDupsEnabled	True

Table 14-10. Switch Configuration Defaults

Parameter	Default
Admin State	Online
Broadcast Enabled	True
InbandEnabled	True
FDMIEnabled	True
FDMIEntries	1000
DefaultDomain ID	1 (0x Hex)
Domain ID Lock	False
Symbolic Name	SANbox
R_A_TOV	10000
E_D_TOV	2000
Principal Priority	254
Configuration Description	Config Default
InteropMode	Standard

Table 14-11. Port Configuration Defaults

Parameter	SFP Port Defaults	XPAK Port Defaults
Admin State	Online	Online
Link Speed	Auto	10-Gbps
Port Type	GL	G
Symbolic Name	Portn, where n is the port number	10G-n, where n is the port number
ALFairness	False	N/A
DeviceScanEnabled	True	True
ForceOfflineRSCN	False	False
ARB_FF	False	N/A
InteropCredit	0	0
ExtCredit	0	N/A
FANEnable	True	N/A
AutoPerfTuning	True	True
LCFEnable	False	False
MFSEnable	False	False
MSEnable	True	False
NoClose	False	N/A
IOStreamGuard	Auto	Auto
VIEnable	False	False
PDISCPingEnable	True	N/A

Table 14-12. Port Threshold Alarm Configuration Defaults

Parameter	Default
ThresholdMonitoringEnabled	False
CRCErrorsMonitoringEnabled ■ RisingTrigger ■ FallingTrigger ■ SampleWindow	True 25 1 10
DecodeErrorsMonitoringEnabled ■ RisingTrigger ■ FallingTrigger ■ SampleWindow	True 25 0 10
ISLMonitoringEnabled ■ RisingTrigger ■ FallingTrigger ■ SampleWindow	True 2 0 10
LoginMonitoringEnabled ■ RisingTrigger ■ FallingTrigger ■ SampleWindow	True 5 1 10
LogoutMonitoringEnabled ■ RisingTrigger ■ FallingTrigger ■ SampleWindow	True 5 1 10
LOSMonitoringEnabled ■ RisingTrigger ■ FallingTrigger ■ SampleWindow	True 100 5 10

Table 14-13. Zoning Configuration Defaults

Parameter	Default
MergeAutoSave	True
DefaultZone	Allow
DiscardInactive	False

Table 14-14. SNMP Configuration Defaults

Parameter	Default
SNMPEnabled	True
Contact	<syscontact undefined>
Location	<sysLocation undefined>
Description	SANbox 5802V Series FC Switch
ObjectID	1.3.6.1.4.1.3873.1.9
AuthFailureTrap	False
ProxyEnabled	True
SNMPv3Enabled	False
Trap [1-5] Address	Trap 1: 10.0.0.254; Traps 2–5: 0.0.0.0
Trap [1-5] Port	162
Trap [1-5] Severity	Warning
Trap [1-5] Version	2
Trap [1-5] Enabled	False

Table 14-15. RADIUS Configuration Defaults

Parameter	Default
DeviceAuthOrder	Local
UserAuthOrder	Local
TotalServers	0
DeviceAuthServer	False
UserAuthServer	False
AccountingServer	False
ServerIPAddress	10.0.0.1
ServerUDPPort	1812
Timeout	2 seconds
Retries	0
SignPackets	False

Table 14-16. Switch Services Configuration Defaults

Parameter	Default
TelnetEnabled	True
SSHEnabled	False
GUIMgmtEnabled	True
SSLMgmtEnabled	False
EmbeddedGUIEnabled	True
SNMPEnabled	True
NTPEnabled	False
CIMEnabled	True
FTPEnabled	True.
MgmtServerEnabled	True
CallHomeEnabled	True

Table 14-17. System Configuration Defaults

Parameter	Default
Ethernet Network Enable	True
Ethernet Network Discovery	Static
Ethernet Network IP Address	10.0.0.1
Ethernet Network IP Mask	255.0.0.0
Ethernet Gateway Address	10.0.0.254
Admin Timeout	30 minutes
InactivityTimeout	0
LocalLogEnabled	True
RemotelogEnabled	False
RemoteLogHostAddress	10.0.0.254
NTPClientEnabled	False
NTPServerAddress	10.0.0.254
EmbeddedGUIEnabled	True

Table 14-18. Security Configuration Defaults

Parameter	Default
AutoSave	True
FabricBindingEnabled	False
PortBindingEnabled	False

Security

NOTE:

This command requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Opens a Security Edit session in which to manage the security database on a switch. Refer to the "Group" command on page 14-29 and the "Securityset" command on page 14-81.

Authority Admin session. The keywords Active, History, Limits, and List are available without an Admin session.

Syntax

security
- active
- cancel
- clear
- edit
- history
- limits
- list
- restore
- save

Keywords

active

Displays the active security set, its groups, and group members. This keyword does not require an Admin session.

cancel

Closes a Security Edit session without saving changes. Use the Edit keyword to open a Security Edit session.

clear

Clears all inactive security sets from the volatile edit copy of the security database. This keyword does not affect the non-volatile security database. However, if you enter the Security Clear command followed by the Security Save command, the non-volatile security database will be cleared from the switch.

NOTE:

The preferred method for clearing the security database from the switch is the Reset Security command.

edit

Initiates a Security Edit session in which to make changes to the security database. A Security Edit session enables you to use the Group and Securityset commands to create, add, and delete security sets, groups, and group members. To close a Security Edit session and save changes, enter the Security Save command. To close a Security Edit session without saving changes, enter the Security Cancel command.

history

Displays history information about the security database and the active security set, including the account name that made changes and when those changes were made. This keyword does not require an Admin session.

limits

Displays the current totals and the security database limits for the number of security sets, groups, members per group, and total members. This keyword does not require an Admin session.

list

Displays all security sets, groups, and group members in the security database. This keyword does not require an Admin session.

restore

Restores the volatile security database with the contents of the non-volatile security database. If the AutoSave parameter is False, you can use this keyword to revert changes to the volatile security database that were propagated from another switch in the fabric through security set activation or merging fabrics. Refer to Table 14-18 for information about the AutoSave parameter.

save

Saves the changes that have been made to the security database during a Security Edit session. Changes you make to any security set will not take effect until you activate that security set. Refer to the “Securityset” command on page 14-81 for information about activating a security set.

Examples

The following is an example of the Security Active command:

```
SANbox #> security active
  Active Security Information

  SecuritySet  Group  GroupMember
  -----------  -----  -----------
  alpha
               group1 (ISL)
                      10:00:00:00:00:10:21:16
                         Authentication     Chap
                         Primary Hash       MD5
                         Primary Secret     ********
                         Secondary Hash     SHA-1
                         Secondary Secret   ********
                         Binding            0
                      10:00:00:00:00:10:21:17
                         Authentication     Chap
                         Primary Hash       MD5
                         Primary Secret     ********
                         Secondary Hash     SHA-1
                         Secondary Secret   ********
                         Binding            0
```

The following is an example of the Security History command:

```
SANbox #> security history
  Active Database Information
  ---------------------------
  SecuritySetLastActivated/DeactivatedBy  Remote
  SecuritySetLastActivated/DeactivatedOn  day month date time year
  Database Checksum                   00000000

  Inactive Database Information
  -----------------------------
  ConfigurationLastEditedBy           admin@IB-session11
  ConfigurationLastEditedOn           day month date time year
  Database Checksum                   00007558
```

The following is an example of the Security Limits command:

```
SANbox #> security limits
  Security Attribute   Maximum   Current   [Name]
  ------------------   -------   -------   ------
  MaxSecuritySets      4         1
  MaxGroups            16        2
  MaxTotalMembers      1000      19
  MaxMembersPerGroup   1000
                                 4         group1
                                 15        group2
```

The following is an example of the Security List command:

```
SANbox #> security list
  Active Security Information
  SecuritySet  Group  GroupMember
  -----------  -----  -----------
  No active securityset defined.

  Configured Security Information
  SecuritySet  Group  GroupMember
  -----------  -----  -----------
  alpha
               group1 (ISL)
                      10:00:00:00:00:10:21:16
                         Authentication     Chap
                         Primary Hash       MD5
                         Primary Secret     ********
                         Secondary Hash     SHA-1
                         Secondary Secret   ********
                         Binding            0
                      10:00:00:00:00:10:21:17
                         Authentication     Chap
                         Primary Hash       MD5
                         Primary Secret     ********
                         Secondary Hash     SHA-1
                         Secondary Secret   ********
                         Binding            0
```

Securityset

NOTE:

This command requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Manages security sets in the security database.

Authority Admin session and a Security Edit session. Refer to the "Security" command on page 14-77 for information about starting a Security Edit session. The Active, Groups, and List keywords are available without an Admin session. You must close the Security Edit session before using the Activate and Deactivate keywords.

Syntax

securityset

activate [security_set]
active
add [security_set] [group_list]
copy [security_set_source] [security_set_destination]
create [security_set]
deactivate
delete [security_set]
groups [security_set]
list
remove [security_set] [group]
rename [security_set_old] [security_set_new]

Keywords

activate [security_set]

Activates the security set given by [security_set] and deactivates the currently active security set. Close the Security Edit session using the Security Save or Security Cancel command before using this keyword.

active

Displays the name of the active security set. This keyword is available to without an Admin session.

add [security_set] [group_list]

Adds one or more groups given by [group_list] to the security set given by [security_set]. Use a <space> to delimit multiple group names in [group_list]. A security set can have a maximum of three groups, but no more than one group of each group type.

copy [security_set_source] [security_set_destination]

Creates a new security set named [security_set_destination] and copies into it the membership from the security set given by [security_set_source].

create [security_set]

Creates the security set with the name given by [security_set]. A security set name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The security database supports a maximum of four security sets.

deactivate

Deactivates the active security set. Close the Security Edit session before using this keyword.

delete [security_set]

Deletes the security set given by [security_set]. If the specified security set is active, the command is suspended until the security set is deactivated.

groups [security_set]

Displays all groups that are members of the security set given by [security_set]. This keyword is available without an Admin session.

list

Displays a list of all security sets. This keyword is available without an Admin session.

remove [security_set] [group]

Removes a group given by [group] from the security set given by [security_set]. If [security_set] is the active security set, the group will not be removed until the security set has been deactivated.

rename [security_set_old] [security_set_new]

Renames the security set given by [security_set_old] to the name given by [security_set_new].

Notes

Refer to the “Group” command on page 14-29 for information about creating and managing groups.

Examples

The following is an example of the Securityset Active command

```
SANbox #> securityset active
  Active SecuritySet Information
  ------------------------------
  ActiveSecuritySet alpha
  LastActivatedBy  Remote
  LastActivatedOn  day month date time year
```

The following is an example of the Securityset Groups command

```
SANbox #> securityset groups alpha
  Current list of Groups for SecuritySet: alpha
  --------------------------------------
  group1 (ISL)
  group2 (Port)
```

The following is an example of the Securityset List command

```
SANbox #> securityset list
Current list of SecuritySets
----------------------------
  alpha
  beta
```

Set Alarm

Controls the display of alarms in the session output stream or clears the alarm log.

Authority Admin session for the Clear keyword. Otherwise, none.

Syntax **set alarm [option]**

Keywords **[option]**
[option] can be one of the following:

clear

Clears the alarm log history. This value requires an Admin session.

on

Enables the display of alarms in the session output stream.

off

Disables the display of alarms in the session output stream. Disabling the display of alarms in the output stream allows command scripts to run without interruption.

Examples The following is an example of the Set Alarm command:

```
SANbox #> set alarm on
```

Set Beacon

Enables or disables the flashing of the Logged-In LEDs for the purpose of locating a switch.

Authority None

Syntax **set beacon [state]**

Keywords **[state]**

[state] can be one of the following:

on

Enables the flashing beacon.

off

Disables the flashing beacon.

Examples The following is an example of the Set Beacon command:

```
SANbox #> set beacon on
```

Set Config Port

Sets the port configuration parameters for one or more ports. The changes you make with this command are not retained when you reset or power cycle the switch unless you save them using the Config Save command.

Authority Admin session and a Config Edit session

Syntax **set config port *[port_number]***

or

set config ports *[port_number]*

Keywords **port *[port_number]***

Initiates an edit session in which to change configuration parameters for the port number given by [port_number]. If you omit [port_number], the system begins with port 0 and proceeds in order through the last port. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets. Enter “q” to end the configuration for one port, or “qq” to end the configuration for all ports. Table 14-19 describes the port configuration parameters.

ports *[port_number]*

Initiates an editing session in which to change configuration parameters for all ports based on the configuration for the port given by [port_number]. If you omit [port_number], port 0 is used. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets. Enter “q” to end the configuration. Table 14-19 describes the port configuration parameters.

Table 14-19. Port Configuration Parameters

Parameter	Description
AdminState	Port administrative state: ■ Online – Activates and prepares the port to send data. This is the default. ■ Offline – Prevents the port from receiving signal and accepting a device login. ■ Diagnostics – Prepares the port for testing and prevents the port from accepting a device login. ■ Down – Disables the port by removing power from the port lasers.

Table 14-19. Port Configuration Parameters (Continued)

Parameter	Description
LinkSpeed	Transmission speed: ■ SFP Ports: 1-Gbps, 2 Gbps, 4-Gbps, 8-Gbps, or Auto. The default is Auto. 8-Gbps SFPs do not support the 1-Gbps setting. Settting a port to 1-Gbps that has an 8-Gbps SFP will down the port. ■ XPAK Ports: 10-Gbps, 20-Gbps, or Auto. The default is Auto.
PortType	Port types: ■ SFP Ports: GL, G, F, FL, Donor. The default is GL. ■ XPAK Ports: GL, G, F, FL, Donor. The default is GL.
SymbolicPortName	Descriptive name for the port. The name can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is Port *n*, where *n* is the port number.
ALFairness (SFP ports only)	Arbitration loop fairness. Enables (True) or disables (False) the switch's priority to arbitrate on the loop. The default is False.
DeviceScanEnabled	Enables (True) or disables (False) the scanning of the connected device for FC-4 descriptor information during login. The default is True.
ForceOfflineRSCN	Enables (False) or disables (True) the immediate transmission of RSCN messages when communication between a port and a device is interrupted. If enabled, the RSCN message is delayed for 200 ms for locally attached devices and 400 ms for devices connected through other switches. The default is False. This parameter is ignored if IOStreamGuard is enabled.
ARB_FF	Send ARB_FF (True) instead of IDLEs (False) on the loop. The default is False.
InteropCredit	Interoperability credit. The number of buffer-to-buffer credits per port. 0 means the default is unchanged. Default buffer-to-buffer credits are 16 per port. Changing interoperability credits is necessary only for E_Ports that are connected to non-FC-SW-2-compliant switches. Contact your authorized maintenance provider for assistance in using this feature.

Table 14-19. Port Configuration Parameters (Continued)

Parameter	Description
FANEnable	Fabric address notification. Enables (True) or disables (False) the communication of the FL_Port address, port name, and node name to the logged-in NL_Port. The default is True.
AutoPerfTuning	Automatic performance tuning for FL_Ports only. The default is True. ■ If AutoPerfTuning is enabled (True) and the port is an FL_Port, MFSEnable is automatically enabled. LCFEnable and VIEnable are overridden to False. ■ If AutoPerfTuning is disabled (False), MFSEnable, LCFEnable, and VIEnable retain their original values.
LCFEnable	Link control frame preference routing. This parameter appears only if AutoPerfTuning is False. Enables (True) or disables (False) preferred routing of frames with R_CTL = 1100 (Class 2 responses). The default is False. Enabling LCFEnable will disable MFSEnable.
MFSEnable	Multi-Frame Sequence bundling. This parameter appears only if AutoPerfTuning is False. Prevents (True) or allows (False) the interleaving of frames in a sequence. The default is False. Enabling MFSEnable disables LCFEnable and VIEnable.
VIEnable	Virtual Interface (VI) preference routing. This parameter appears only if AutoPerfTuning is False. Enables (True) or disables (False) VI preference routing. The default is False. Enabling VIEnable will disable MFSEnable.
MSEnable	Management server enable. Enables (True) or disables (False) management server on this port. The default is True.
NoClose	Loop circuit closure prevention. Enables (True) or disables (False) the loop's ability to remain in the open state indefinitely. True reduces the amount of arbitration on a loop when there is only one device on the loop. The default is False.

Table 14-19. Port Configuration Parameters (Continued)

Parameter	Description
IOStreamGuard	Enables or disables the suppression of RSCN messages. IOStreamGuard can have the following values: ■ Enable – Suppresses the reception of RSCN messages from other ports for which IOStreamGuard is enabled. ■ Disable – Allows free transmission and reception of RSCN messages. ■ Auto – Suppresses the reception of RSCN messages when the port is connected to an initiator device with a QLogic HBA. For older QLogic HBAs, such as the QLA2200, the DeviceScanEnabled parameter must also be enabled. The default is Auto.
PDISCPingEnable (SFP ports only)	Enables (True) or disables (False) the transmission of ping messages from the switch to all devices on a loop port. The default is True.

Examples

The following is an example of the Set Config Port command:

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config port 1

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Configuring Port Number:  1
  ------------------------

  AdminState       (1=Online, 2=Offline, 3=Diagnostics, 4=Down)       [Online]
  LinkSpeed        (1=1Gb/s, 2=2Gb/s, 4=4Gb/s, 8=8Gb/s, A=Auto)       [Auto  ]
  PortType         (GL / G / F / FL / Donor)                          [GL    ]
  SymPortName      (string, max=32 chars)                             [Port1 ]
  ALFairness       (True / False)                                     [False ]
  DeviceScanEnable (True / False)                                     [True  ]
  ForceOfflineRSCN (True / False)                                     [False ]
  ARB_FF           (True / False)                                     [False ]
  InteropCredit    (decimal value, 0-255)                             [0     ]
  ExtCredit        (dec value, increments of 15, non-loop only)       [0     ]
  FANEnable        (True / False)                                     [True  ]
  AutoPerfTuning   (True / False)                                     [False ]
  LCFEnable        (True / False)                                     [False ]
  MFSEnable        (True / False)                                     [False ]
  VIEnable         (True / False)                                     [False ]
  MSEnable         (True / False)                                     [True  ]
  NoClose          (True / False)                                     [False ]
  IOStreamGuard    (Enable / Disable / Auto)                          [Disable]
  PDISCPingEnable  (True / False)                                     [True  ]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
```

The following is an example of the Set Config Port command for an XPAK port:

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config port 20

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Configuring Port Number:  20
  ------------------------

AdminState       (1=Online, 2=Offline, 3=Diagnostics, 4=Down) [Online  ]
LinkSpeed        (10=10Gb/s)                                  [10Gb/s  ]
PortType         (G / F)                                      [G       ]
SymPortName      (string, max=32 chars)                       [10G-20  ]
DeviceScanEnable (True / False)                               [True    ]
ForceOfflineRSCN (True / False)                               [False   ]
AutoPerfTuning   (True / False)                               [Fales   ]
LCFEnable        (True / False)                               [False   ]
MFSEnable        (True / False)                               [False   ]
VIEnable         (True / False)                               [False   ]
MSEnable         (True / False)                               [True    ]
IOStreamGuard    (Enable / Disable / Auto)                    [Disabled]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
```

Set Config Security

NOTE:

This command requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Configures the security database for the automatic saving of changes to the active security set and fabric binding. The changes you make with this command are not retained when you reset or power cycle the switch unless you save them using the Config Save command.

Authority Admin session and a Config Edit session

Syntax **set config security**

This command initiates an editing session in which to change the security database configuration. The system displays each parameter one line at a time and prompts you for a value. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets. Enter “q” or "Q" to end the editing session. Table 14-20 describes the security configuration parameters.

Table 14-20. Security Configuration Parameters

Parameter	Description
AutoSave	Enables (True) or disables (False) the saving of changes to active security set in the switch’s permanent memory. The default is True.
FabricBindingEnabled	Enables (True) or disables (False) the configuration and enforcement of fabric binding on all switches in the fabric. Fabric binding associates switch worldwide names with a domain ID in the creation of ISL groups. The default is False.

Examples

The following is an example of the Set Config Security command:

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config security
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  FabricBindingEnabled  (True / False)     [False]
  AutoSave              (True / False)     [True ]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
```

Set Config Security Portbinding

Configures port binding.

Authority Admin session and a Config Edit session

Syntax **set config security portbinding [port_number]**

Keywords **[port_number]**
Initiates an editing session in which to change the port binding configuration for the port given by [port_number]. The system displays each parameter one line at a time and prompts you for a value. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets. Enter “q” or "Q" to end the editing session. Table 14-21 describes the Set Config Security Portbinding parameters.

Table 14-21. Port Binding Configuration Parameters

Parameter	Description
PortBindingEnabled	Enables (True) or disables (False) port binding for the port given by [port_number].
WWN	Worldwide port name for the port/device that is allowed to connect to the port given by [port_number].

Examples The following is an example of the Set Config Security Portbinding command:

```
SANbox #> admin start
SANbox (admin) config edit
SANbox (admin-config) #> set config security portbinding 1

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  PortBindingEnabled (True / False)[False] true
  WWN                (N=None / WWN)[None ] 10:00:00:c0:dd:00:b9:f9
  WWN                (N=None / WWN)[None ] 10:00:00:c0:dd:00:b9:f8
  WWN                (N=None / WWN)[None ] n

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
```

Set Config Switch

Sets the switch configuration parameters. The changes you make with this command are not retained when you reset or power cycle the switch unless you save them using the Config Save command.

Authority Admin session and a Config Edit session

Syntax **set config switch**

This command initiates an editing session in which to change switch configuration settings. The system displays each parameter one line at a time and prompts you for a value. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets. Table 14-22 describes the switch configuration parameters.

Table 14-22. Switch Configuration Parameters

Parameter	Description
AdminState	Switch administrative state. ■ Online – Activates and prepares the ports to send data. This is the default. ■ Offline – Prevents the ports from receiving signal and accepting a device login. ■ Diagnostics – Prepares the ports for testing and prevents the ports from accepting a device login. ■ Down – Disables the ports by removing power from the port lasers.
BroadcastEnabled	Broadcast. Enables (True) or disables (False) forwarding of broadcast frames. The default is True.
InbandEnabled	Inband management. Enables (True) or disables (False) the ability to manage the switch over an ISL. The default is True.
FDMIEnabled	Fabric Device Monitoring Interface. Enables (True) or disables (False) the monitoring of target and initiator device information. The default is True.
FDMIEntries	The number of device entries to maintain in the FDMI database. Enter a number from 0–1000. The default is 1000.
DefaultDomainID	Default domain ID. The default is 1.
DomainIDLock	Prevents (True) or allows (False) dynamic reassignment of the domain ID. The default is False.
SymbolicName	Descriptive name for the switch. The name can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is SANbox.

Table 14-22. Switch Configuration Parameters (Continued)

Parameter	Description
R_A_TOV	Resource Allocation Timeout Value. The number of milliseconds the switch waits to allow two ports to allocate enough resources to establish a link. The default is 10000.
E_D_TOV	Error Detect Timeout Value. The number of milliseconds a port is to wait for errors to clear. The default is 2000.
PrincipalPriority	The priority used in the FC-SW-2 principal switch selection algorithm. 1 is high, 255 is low. The default is 254.
ConfigDescription	Switch configuration description. The configuration description can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is Config Default.

Examples

The following is an example of the Set Config Switch command:

```
SANbox #> admin start
SANbox (admin) #> config edit
SANbox (admin-config) #> set config switch

  A list of attributes with formatting and default values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  AdminState          (1=Online, 2=Offline, 3=Diagnostics)   [Online        ]
  BroadcastEnabled    (True / False)                         [True          ]
  InbandEnabled       (True / False)                         [True          ]
  FDMIEnabled         (True / False)                         [True          ]
  FDMIEntries         (decimal value, 0-1000)                [1000          ]
  DefaultDomainID     (decimal value, 1-239)                 [2             ]
  DomainIDLock        (True / False)                         [False         ]
  SymbolicName        (string, max=32 chars)                 [SANbox        ]
  R_A_TOV             (decimal value, 100-100000 msec)       [10000         ]
  E_D_TOV             (decimal value, 10-20000 msec)         [2000          ]
  PrincipalPriority   (decimal value, 1-255)                 [254           ]
  ConfigDescription   (string, max=64 chars)                 [Default Config]
```

Set Config Threshold

Sets the port alarm threshold parameters by which the switch monitors port performance and generates alarms. The changes you make with this command are not retained when you reset or power cycle the switch unless you save them using the Config Save command.

Authority Admin session and a Config Edit session

Syntax **set config threshold**

Initiates a configuration session by which to generate and log alarms for selected events. The system displays each event, its triggers, and a sampling window one line at a time and prompts you for a value. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets. Table 14-23 describes the port alarm threshold parameters.

Table 14-23. Port Alarm Threshold Parameters

Parameter	Description
Threshold Monitoring Enabled	Master enable/disable parameter for all events. Enables (True) or disables (False) the generation of all enabled event alarms. The default is False.
CRCErrorsMonitoringEnabled DecodeErrorsMonitoringEnabled ISLMonitoringEnabled LoginMonitoringEnabled LogoutMonitoringEnabled LOSMonitoringEnabled	The event type enable/disable parameter. Enables (True) or disables (False) the generation of alarms for each of the following events: ■ CRC errors ■ Decode errors ■ ISL connection count ■ Device login errors ■ Device logout errors ■ Loss-of-signal errors
Rising Trigger	The event count above which a rising trigger alarm is logged. The switch will not generate another rising trigger alarm for that event until the count descends below the falling trigger and again exceeds the rising trigger.
Falling Trigger	The event count below which a falling trigger alarm is logged. The switch will not generate another falling trigger alarm for that event until the count exceeds the rising trigger and descends again below the falling trigger.
Sample Window	The time in seconds in which to count events.

Notes

The switch will down a port if an alarm condition is not cleared within three consecutive sampling windows (by default, 30 seconds). Reset the port to bring it back online. An alarm is cleared when the threshold monitoring detects that the error rate has fallen below the falling trigger.

Examples

The following is an example of the Set Config Threshold command:

```
SANbox #> admin start
SANbox  (admin) #> config edit
SANbox (admin-config) #> set config threshold
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list
press 'q' or 'Q' and the ENTER key to do so.

ThresholdMonitoringEnabled     (True / False)              [False     ]
CRCErrorsMonitoringEnabled     (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [25        ]
  FallingTrigger               (decimal value, 0-1000)     [1         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
DecodeErrorsMonitoringEnabled  (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [25        ]
  FallingTrigger               (decimal value, 0-1000)     [0         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
ISLMonitoringEnabled           (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [2         ]
  FallingTrigger               (decimal value, 0-1000)     [0         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
LoginMonitoringEnabled         (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [5         ]
  FallingTrigger               (decimal value, 0-1000)     [1         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
LogoutMonitoringEnabled        (True / False)              [True      ]
  RisingTrigger                (decimal value, 1-1000)     [5         ]
  FallingTrigger               (decimal value, 0-1000)     [1         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]
 LOSMonitoringEnabled           (True / False)             [True      ]
  RisingTrigger                (decimal value, 1-1000)     [100       ]
  FallingTrigger               (decimal value, 0-1000)     [5         ]
  SampleWindow                 (decimal value, 1-1000 sec) [10        ]

Finished configuring attributes.
This configuration must be saved (see config save command) and activated (see
config activate command) before it can take effect.
To discard this configuration use the config cancel command.
```

Set Config Zoning

Configures the zoning database. The changes you make with this command are not retained when you reset or power cycle the switch unless you save them using the Config Save command.

Authority Admin session and a Config Edit session

Syntax **set config zoning**

Initiates an editing session in which to change the zoning database configuration. The system displays each parameter one line at a time and prompts you for a value. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets.

Table 14-24. Zoning Configuration Parameters

Parameter	Description
MergeAutoSave	Enables (True) or disables (False) the saving of changes to active zone set in the switch's non-volatile zoning database.The default is True. Disabling the MergeAutoSave parameter can be useful for preventing the propagation of zoning information when experimenting with different zoning schemes. However, leaving the MergeAutoSave parameter disabled can disrupt device configurations should a switch have to be reset. For this reason, the MergeAutoSave parameter should be enabled in a production environment.
DefaultZone	Enables (Allow) or disables (Deny) communication among ports/devices that are not defined in the active zone set or when there is no active zone set. The DefaultZone value must be the same on all switches in the fabric. The default is Allow.
DiscardInactive	Enables (True) or disables (False) the discarding of all inactive zone sets from that zoning database. Inactive zone sets are all zone sets except the active zone set. The default is False.

Examples

The following is an example of the Set Config Zoning command.

```
SANbox #> admin start
SANbox (admin) #> config edit
   The config named default is being edited.
SANbox (admin-config) #> set config zoning
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list press 'q'
or 'Q' and the ENTER key to do so.

  MergeAutoSave        (True / False)  [True ]
  DefaultZone          (Allow / Deny)  [Allow ]
  DiscardInactive      (True / False)  [False]

  Finished configuring attributes.
  This configuration must be saved (see config save command) and
  activated (see config activate command) before it can take effect.
  To discard this configuration use the config cancel command.
```

Set Log

Specifies the events to record in the event log and display on the screen. You determine what events to record in the switch event log using the Component, Level, and Port keywords. You determine what events are automatically displayed on the screen using the Display keyword. Alarms are always displayed on the screen.

Authority Admin session

Syntax **set log**

archive
clear
component [filter_list]
display [filter]
level [filter]
port [port_list]
restore
save
start (default)
stop

Keywords **archive**

Collects all log entries and stores the result in new file named *logfile* that is maintained in switch memory where it can be downloaded using FTP. To download *logfile*, open an FTP session, log in with account name/password of “images” for both, and type “get logfile”.

clear

Clears all log entries.

component [filter_list]

Specifies one or more components given by [filter_list] to monitor for events. A component is a firmware module that is responsible for a particular portion of switch operation. Use a <space> to delimit values in the list. [filter_list] can be one or more of the following:

All

Monitors all components. To maintain optimal switch performance, do not use this setting with the Level keyword set to Info.

Eport

Monitors all E_Ports.

Mgmtserver

Monitors management server status.

Nameserver

Monitors name server status.

None

Monitor none of the component events.

Port

Monitors all port events.

QFS

Monitors all QLogic Fabric Service (QFS) events. QFS governs Call Home e-mail notification.

SNMP

Monitors all SNMP events.

Switch

Monitors switch management events.

Zoning

Monitors zoning conflict events.

display [filter]

Specifies the log events to automatically display on the screen according to the event severity levels given by [filter]. [filter] can be one of the following values:

Critical

Critical events. The critical severity level describes events that are generally disruptive to the administration or operation of the fabric, but require no action.

Warn

Warning events. The warning severity level describes events that are generally not disruptive to the administration or operation of the fabric, but are more important than the informative level events.

Info

Informative events. The informative severity level describes routine events associated with a normal fabric.

None

Specifies no severity levels for display on the screen.

level [filter]

Specifies the severity level given by [filter] to use in monitoring and logging events for the specified components or ports. [filter] can be one of the following values:

Critical

Monitors critical events. The critical level describes events that are generally disruptive to the administration or operation of the fabric, but require no action. This is the default severity level.

Warn

Monitors warning and critical events. The warning level describes events that are generally not disruptive to the administration or operation of the fabric, but are more important than the informative level events.

Info

Monitors informative, warning, and critical events. The informative level describes routine events associated with a normal fabric.

NOTE:

Logging events at the Info severity level can deplete switch resources because of the high volume of events.

None

Monitors none of the severity levels.

port [port_list]

Specifies one or more ports to monitor for events. Choose one of the following values:

[port_list]

Specifies the port or ports to monitor. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15.

All

Specifies all ports.

None

Disables monitoring on all ports.

restore

Restores and saves the port, component, and level settings to the default values.

save

Saves the log settings for the component, severity level, port, and display level. These settings remain in effect after a switch reset. The log settings can be viewed using the Show Log Settings command. To export log entries to a file, use the Set Log Archive command.

start

Starts the logging of events based on the Port, Component, and Level keywords assigned to the current configuration. The logging continues until you enter the Set Log Stop command.

stop

Stops logging of events.

Notes

In addition to critical, warn, and informative severity levels, the highest event severity level is alarm. The alarm level describes events that are disruptive to the administration or operation of a fabric and require administrator intervention. Alarms are always logged and always displayed on the screen.

Set Pagebreak

Specifies how much information is displayed on the screen at a time. This command is useful for disabling pagebreaks to allow command scripts to run without interruption.

Authority None

Syntax **pagebreak [state]**

Keywords **[state]**

[state] can be one of the following:

on

Limits the display of information to 20 lines at a time. The page break function affects the following commands:

- Alias (List, Members)
- Show (Alarm, Log, Test Log)
- Zone (List, Members)
- Zoneset (List, Zones)
- Zoning (Active, List)

off

Allows continuous display of information without a break. This is the default.

Examples

The following is an example of the Set Pagebreak command:

```
SANbox #> set pagebreak on
SANbox #> zone list

  Zone        ZoneSet
  ----        -------
  Zone1
              alpha
              beta

  Zone2
              delta
              echo

  Zone3
              sierra
              tango

  Zone4
              gamma
              delta

         Press any key to continue, 'q' to quit ...
```

Set Port

Sets port state and speed for the specified port temporarily until the next switch reset or new configuration activation. This command also clears port counters.

Authority Admin session

Syntax

set port clear

or

set port [port_number]

clear

speed [transmission_speed]

state [state]

Keywords

[port_number]

Specifies the port. Ports are numbered beginning with 0.

clear

Clears the counters on all ports or the port given by [port_number].

speed [transmission_speed]

Specifies the transmission speed for the specified port. Choose one of the following port speed values:

1Gb/s

One gigabit per second. 8-Gbps SFPs do not support the 1-Gbps setting. Setting a port to 1-Gbps that has an 8-Gbps SFP will down the port.

2Gb/s

Two gigabits per second.

4Gb/s

Four gigabits per second.

8Gb/s

Eight gigabits per second.

10Gb/s

Ten gigabits per second. This applies only to ports 20–23.

20Gb/s

Twenty gigabits per second. This applies only to ports 20–23 with a 20-Gbps license key.

Auto

The port speed is automatically detected.

state [state]

Specifies one of the following administrative states for the specified port:

Online

Activates and prepares the port to send data.

Offline

Prevents the port from receiving signal and accepting a device login.

Diagnostics

Prepares the port for testing and prevents the port from accepting a device login.

Down

Disables the port by removing power from the port lasers.

Set Setup Callhome

Configures the Call Home database for managing e-mail notifications of fabric problems.

Authority Admin session

Syntax **set setup callhome**
Prompts you in a line-by-line fashion to configure the Call Home database. Table 14-26 describes the Call Home configuration fields.

Table 14-25. Call Home Service Configuration Settings

Entry	Description
PrimarySMTPServerAddr	IP address (version 4 or 6) or DNS host name of the primary SMTP server. The default is 0.0.0.0.
PrimarySMTPServerPort	Service port number that the primary SMTP server is monitoring for SMTP agents. The default is 25.
PrimarySMTPServerEnabled	Enables (True) or disables (False) the primary SMTP server. The default is False.
SecondarySMTPServerAddr	IP address (version 4 or 6) or DNS host name of the secondary SMTP server. The default is 0.0.0.0.
SecondarySMTPServerPort	Service port number that the secondary SMTP server is monitoring for SMTP agents. The default is 25.
SecondarySMTPServerEnabled	Enable (True) or disable (False) the secondary SMTP server. The default is False.
ContactEmailAddress	E-mail address of the person to be notified to respond to the e-mail message. The format is *account@domain*. This information is included in the e-mail message when the profile format is FullText.
PhoneNumber	Contact phone number to be included in the e-mail message text. This information is included in the e-mail message when the profile format is FullText.
StreetAddress	Contact street address to be included in the e-mail message text. This information is included in the e-mail message when the profile format is Full-Text.

Table 14-25. Call Home Service Configuration Settings

Entry	Description
FromEmailAddress	E-mail address that is defined as the sending address in the *From:* field of the e-mail message. The format is *account@domain*. This field is required. Undeliverable messages are returned to this address unless overridden by the ReplayToEmailAddress parameter.
ReplyToEmailAddress	E-mail address that is to receive replies to the out-bound e-mail message. The format is *account@domain*. This parameter overrides the FromEmailAddress parameter.
ThrottleDupsEnabled	Enables (True) or disables (False) the throttling of duplicate e-mail messages in the message queue. When enabled, duplicate e-mail messages that enter the queue within 15 seconds of the original are suppressed. The original message is sent with a report of the number of suppressed duplicates.

Notes

- The Callhome service must be active to support Call Home e-mail notification. Refer to the "Set Setup Services" command on page 14-116.
- The primary, secondary, or both SMTP servers must be properly addressed and enabled on the switch to activate Call Home e-mail notification. If both SMTP servers are enabled, the primary server is active.
- The switch will reroute Call Home e-mail messages to the secondary SMTP server if the primary should become unavailable. Primary and secondary identities do not change upon transfer of control.
- Callhome profiles determine the events, conditions, and e-mail recipients of Call Home e-mail messages. Refer to the "Profile" command on page 14-61 for information about creating Call Home profiles.

Examples

The following is an example of the Set Setup Callhome command:

```
SANbox (admin) #> set setup callhome

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the current value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.
If either the Primary or Secondary SMTP Servers are enabled, the FromEmailAddress
attribute must be configured or the switch will not attempt to deliver messages.
Current Values:

  PrimarySMTPServerAddr      0.0.0.0
  PrimarySMTPServerPort      25
  PrimarySMTPServerEnable    False
  SecondarySMTPServerAddr    0.0.0.0
  SecondarySMTPServerPort    25
  SecondarySMTPServerEnable  False
  ContactEmailAddress        nobody@localhost.localdomain
  PhoneNumber                <undefined>
  StreetAddress              <undefined>
  FromEmailAddress           nobody@localhost.localdomain
  ReplyToEmailAddress        nobody@localhost.localdomain
  ThrottleDupsEnabled        True

New Value (press ENTER to accept current value, 'q' to quit):
  PrimarySMTPServerAddr      (IPv4, IPv6, or hostname)  :
  PrimarySMTPServerPort      (decimal value)            :
  PrimarySMTPServerEnable    (True / False)             :
  SecondarySMTPServerAddr    (IPv4, IPv6, or hostname)  :
  SecondarySMTPServerPort    (decimal value)            :
  SecondarySMTPServerEanble  (True / False)             :
  ContactEmailAddress        (ex: admin@company.com)    :
  PhoneNumber                (ex: +1-800-123-4567)      :
  StreetAddress              (include all address info) :
  FromEmailAddress           (ex: bldg3@company.com)    :
  ReplyToEmailAddress        (ex: admin3@company.com)   :
  ThrottleDupsEnabled        (True / False)             :

  Do you want to save and activate this Callhome setup? (y/n):
```

Set Setup Radius

NOTE:

This command requires the Fabric Security license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller. Use the Feature command to install a license key.

Configures RADIUS servers on the switch.

Authority Admin session

Syntax **set setup radius**

common

server [server_number]

Keywords **common**

Prompts you in a line-by-line fashion to configure parameters that are common to all RADIUS servers. To configure common and specific RADIUS server parameters, omit the keyword. Table 14-26 describes the common RADIUS configuration parameters.

Table 14-26. Common RADIUS Configuration Parameters

Parameter	Description
DeviceAuthOrder	Authenticator priority for devices: ■ Local: Authenticate devices using only the local security database. This is the default. ■ Radius: Authenticate devices using only the security database on the RADIUS server. ■ RadiusLocal: Authenticate devices using the RADIUS server security database first. If the RADIUS server is unavailable, then use the local switch security database.
UserAuthOrder	Authenticator priority for user accounts: ■ Local: Authenticate users using only the local security database. This is the default. ■ Radius: Authenticate users using only the security database on the RADIUS server. ■ RadiusLocal: Authenticate users using the RADIUS server security database first. If the RADIUS server is unavailable, then use the local switch security database.

Table 14-26. Common RADIUS Configuration Parameters (Continued)

Parameter	Description
TotalServers	Number of RADIUS servers to configure during this session. Setting TotalServers to 0 disables all RADIUS authentication. The default is 0.

server [server_number]
Prompts you in a line-by-line fashion to configure parameters for the RADIUS server given by [server_number]. [server_number] is a positive integer. To configure common and specific RADIUS server parameters, omit the keyword. Table 14-27 describes the specific RADIUS server configuration parameters.

Table 14-27. Specific RADIUS Server Configuration Parameters

Parameter	Description
ServerIPAddress	IP address (version 4 or 6) or DNS host name of the RADIUS server. The default is 10.0.0.1.
ServerUDPPort	User Datagram Protocol (UDP) port number on the RADIUS server. The default is 1812.
DeviceAuthServer	Enable (True) or disable (False) this server for device authentication. The default is False.
UserAuthServer	Enable (True) or disable (False) this server for user account authentication. A user authentication RADIUS server requires a secure management connection (SSL). The default is True.
AccountingServer	Enable (True) or disable (False) this server for auditing of activity during a user session. When enabled, user activity is audited whether UserAuthServer is enabled or not.The default is False. The accounting server UDP port number is the ServerUDPPort value plus 1. The default is 1813.
Timeout	Number of seconds to wait to receive a response from the RADIUS server before timing out. The default is 2.
Retries	Number of retries after the first attempt to establish communication with the RADIUS server fails. The default is 0.
SignPackets	Enable (True) or disable (False) the use of sign packets to protect the RADIUS server packet integrity. The default is False.
Secret	22-byte ASCII string used as a password for authentication purposes between the switch and the RADIUS server.

Examples

The following is an example of the Set Setup Radius Common command:

```
SANbox (admin) #> set setup radius common
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the attributes
  for the server being processed, press 'q' or 'Q' and the ENTER key to do so.
  If you wish to terminate the configuration process completely, press 'qq' or
  'QQ' and the ENTER key to so do.

  PLEASE NOTE:
  -----------
  * SSL must be enabled in order to configure RADIUS User Authentication
    SSL can be enabled using the 'set setup services' command.

  Current Values:
    DeviceAuthOrder  Local
    UserAuthOrder    Local
    TotalServers     1

  New Value (press ENTER to not specify value, 'q' to quit):
    DeviceAuthOrder  1=Local, 2=Radius, 3=RadiusLocal :
    UserAuthOrder    1=Local, 2=Radius, 3=RadiusLocal :
    TotalServers     decimal value, 0-5               :

  Do you want to save and activate this radius setup? (y/n): [n]
```

The following is an example of the Set Setup Radius Server command:

```
SANbox (admin) #> set setup radius server 1
  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the attributes
  for the server being processed, press 'q' or 'Q' and the ENTER key to do so.
  If you wish to terminate the configuration process completely, press 'qq' or
  'QQ' and the ENTER key to so do.

  PLEASE NOTE:
  -----------
  * SSL must be enabled in order to configure RADIUS User Authentication
    SSL can be enabled using the 'set setup services' command.

Server 1 Current Values:
  ServerIPAddress 10.20.11.8
  ServerUDPPort 1812
  DeviceAuthServer True
  UserAuthServer True
  AccountingServer False
  Timeout 10
  Retries 0
  SignPackets False
  Secret **********

New Server 1 Value (press ENTER to accept current value, 'q' to skip):
  ServerIPAddress            (hostname, IPv4, or IPv6 address)     :
  ServerUDPPort              (decimal value)                       :
  DeviceAuthServer           (True / False)                        :
  UserAuthServer             (True / False)                        :
  AccountingServer           (True / False)                        :
  Timeout                    (decimal value, 10-30 secs)           :
  Retries                    (decimal value, 1-3, 0=None)          :
  SignPackets                (True / False)                        :
  Secret                     (1-63 characters, recommend 22+)      :

  Do you want to save and activate this radius setup? (y/n): [n]
```

Set Setup Services

Configures services on the switch.

Authority Admin session

Syntax **set setup services**

This command prompts you in a line-by-line fashion to enable or disable switch services. Table 14-28 describes the switch service parameters. For each parameter, enter a new value or press the Enter key to accept the current value shown in brackets.

NOTE:

Disabling TelnetEnabled or GUIMgmtEnabled will immediately terminate the current Telnet or switch management session. Disable services with caution; it is possible to disable all Ethernet access to the switch.

Table 14-28. Switch Services Settings

Entry	Description
TelnetEnabled	Enables (True) or disables (False) the ability to manage the switch over a Telnet connection. Disabling this service is not recommended. The default is True.
SSHEnabled	Enables (True) or disables (False) Secure Shell (SSH) connections to the switch. SSH secures the remote connection to the switch. To establish a secure remote connection, your workstation must use an SSH client. The default is False. The SSH service requires the Fabric Security license key To purchase a license key, contact your authorized maintenance provider or authorized reseller.
GUIMgmtEnabled	Enables (True) or disables (False) out-of-band management of the switch with Enterprise Fabric Suite 2007 and the Application Programming Interface. If this service is disabled, the switch can only be managed inband or through the serial port. The default is True.

Table 14-28. Switch Services Settings (Continued)

Entry	Description
SSLEnabled	Enables (True) or disables (False) secure SSL connections for management applications including Enterprise Fabric Suite 2007, QuickTools, Application Programming Interface, and SMI-S. The default is False. ■ The SSL service requires the Fabric Security license key. ■ This service must be enabled to authenticate users through a RADIUS server. ■ Enabling SSL automatically creates a security certificate on the switch. ■ To enable secure SSL connections, you must first synchronize the date and time on the switch and workstation. ■ To disable SSL when using a user authentication RADIUS server, the RADIUS server authentication order must be local.
EmbeddedGUIEnabled	Enables (True) or disables (False) the QuickTools embedded switch management application. QuickTools enables you to point at a switch with an internet browser and manage the switch. This parameter is the master control for the Set Setup System command parameter, EmbeddedGUIEnabled. The default is True.
SNMPEnabled	Enables (True) or disables (False) the management of the switch through third-party applications that use the Simple Network Management Protocol (SNMP). This parameter is the master control for the Set Setup SNMP command parameter, SNMPEnabled. The default is True.
NTPEnabled	Enables (True) or disables (False) the Network Time Protocol (NTP) which allows the synchronizing of switch and workstation dates and times with an NTP server. This helps to prevent invalid SSL certificates and timestamp confusion in the event log. The default is False. This parameter is the master control for the Set Setup System command parameter, NTPClientEnabled. The default is False.
CIMEnabled	Enables (True) or disables (False) the management of the switch through third-party applications that use SMI-S.
FTPEnabled	Enables (True) or disables (False) the File Transfer Protocol (FTP) for transferring files rapidly between the workstation and the switch. The default is True.

Table 14-28. Switch Services Settings (Continued)

Entry	Description
MgmtServerEnabled	Enables (True) or disables (False) the management of the switch through third-party applications that use GS-3 Management Server (MS). This parameter is the master control for the Set Config Port command parameter, MSEnable. The default is True.
CallHomeEnabled	Enables (True) or disables (False) the Call Home service which controls e-mail notification. The default is True.

Examples

The following is an example of the Set Setup Services command:

```
SANbox #> admin start
SANbox (admin) #> set setup services

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  PLEASE NOTE:
  -----------
  * Further configuration may be required after enabling a service.

  * If services are disabled, the connection to the switch may be lost.

  * When enabling SSL, please verify that the date/time settings
    on this switch and the workstation from where the SSL connection
    will be started match, and then a new certificate may need to be
    created to ensure a secure connection to this switch.

  TelnetEnabled       (True / False)   [True ]
  SSHEnabled          (True / False)   [False]
  GUIMgmtEnabled      (True / False)   [True ]
  SSLEnabled          (True / False)   [False]
  EmbeddedGUIEnabled  (True / False)   [True ]
  SNMPEnabled         (True / False)   [True ]
  NTPEnabled          (True / False)   [False]
  CIMEnabled          (True / False)   [False]
  FTPEnabled          (True / False)   [True ]
  MgmtServerEnabled   (True / False)   [True ]
  CallHomeEnabled     (True / False)   [True ]

  Do you want to save and activate this services setup? (y/n): [n]
```

Set Setup SNMP

Configures SNMP on the switch.

Authority Admin session

Syntax **set setup snmp**
common
trap [trap_number]

Keywords **common**
Prompts you in a line-by-line fashion to change SNMP configuration parameters that are common for all traps. For each parameter, enter a new value or press the Enter key to accept the current value. To configure common parameters and trap parameters, omit the Common keyword. Refer to Table 14-30 for a description of the SNMP trap parameters. Table 14-29 describes the common SNMP configuration parameters.

Table 14-29. SNMP Common Configuration Parameters

Parameter	Description
SNMPEnabled	Enables (True) or disables (False) SNMP on the switch. The default is True.
Contact	Specifies the name of the person to be contacted to respond to trap events. The name can be up to 64 characters excluding #, semicolon (;), and comma (,). The default is undefined. This value is also passed to the Call Home service configuration.
Location	Specifies the name of the switch location. The name can be up to 64 characters excluding #, semicolon (;), and comma (,). The default is undefined. This value is also passed to the Call Home service configuration.
ReadCommunity	Read community password that authorizes an SNMP agent to read information from the switch. This is a write-only field. The value on the switch and the SNMP management server must be the same. The read community password can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is “public”.
WriteCommunity	Write community password that authorizes an SNMP agent to write information to the switch. This is a write-only field. The value on the switch and the SNMP management server must be the same. The write community password can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is “private”.

Table 14-29. SNMP Common Configuration Parameters (Continued)

Parameter	Description
TrapCommunity	Trap community password that authorizes an SNMP agent to receive traps. This is a write-only field. The value on the switch and the SNMP management server must be the same. The trap community password can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is “public”.
AuthFailureTrap	Enables (True) or disables (False) the generation of traps in response to trap authentication failures. The default is False.
ProxyEnabled	Enables (True) or disables (False) SNMP communication with other switches in the fabric. The default is True.
SNMPv3Enabled	Enables (True) or disables (False) SNMP version 3. The default is False.

trap [trap_number]

Prompts you in a line-by-line fashion to change SNMP trap parameters for the trap number given by [trap_number]. [trap_number] can be 1–5. For each parameter, enter a new value or press the Enter key to accept the current value. To configure common parameters and trap parameters, omit the Trap keyword. Refer to Table 14-29 for a description of the SNMP trap parameters.Table 14-30 describes the trap parameters.

Table 14-30. SNMP Trap Configuration Parameters

Parameter	Description
Trap [1-5] Address	Workstation IP address (version 4 or 6) or DNS host name to which SNMP traps are sent. The default address for trap 1 is 10.0.0.254. The default address for traps 2–5 is 0.0.0.0. Addresses, other than 0.0.0.0, for all traps must be unique.
Trap [1-5] Port	Workstation port to which SNMP traps are sent. Valid workstation port numbers are 1–65535. The default is 162.
Trap [1-5] Severity	Severity level to use when monitoring trap events. The default is Warning.
Trap [1-5] Version	SNMP version (1 or 2) to use in formatting the trap. The default is 2.
Trap [1-5] Enabled	Enables (True) or disables (False) the SNMP trap.

Examples

The following is an example of the Set Setup Snmp Common command:

```
SANbox (admin) #> set setup snmp common
A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    SnmpEnabled      True
    Contact          <sysContact undefined>
    Location         <sysLocation undefined>
    ReadCommunity    public
    WriteCommunity   private
    AuthFailureTrap  False
    ProxyEnabled     True
    SNMPv3Enabled    False

  New Value (press ENTER to not specify value, 'q' to quit):
    SnmpEnabled      (True / False)         :
    Contact          (string, max=64 chars) :
    Location         (string, max=64 chars) :
    ReadCommunity    (string, max=32 chars) :
    WriteCommunity   (string, max=32 chars) :
    AuthFailureTrap  (True / False)         :
    ProxyEnabled     (True / False)         :
    SNMPv3Enabled    (True / False)         :

  Do you want to save and activate this snmp setup? (y/n): [n]
```

The following is an example of the Set Setup Snmp Trap command:

```
SANbox (admin) #> set setup snmp trap 1
A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    Trap1Enabled    True
    Trap1Address    10.20.33.181
    Trap1Port       5001
    Trap1Severity   info
    Trap1Version    2
    Trap1Community  northdakota

  New Value (press ENTER to not specify value, 'q' to quit):
    Trap1Enabled    (True / False)                    :
    Trap1Address    (hostname, IPv4, or IPv6 Address) :
    Trap1Port       (decimal value, 1-65535)          :
    Trap1Severity   (select a severity level)
                    1=unknown     6=warning
                    2=emergency   7=notify
                    3=alert       8=info
                    4=critical    9=debug
                    5=error       10=mark             :
    Trap1Version    (1 / 2)                           :
    Trap1Community  (string, max=32 chars)            :

  Do you want to save and activate this snmp setup? (y/n): [n]
```

Set Setup System

Configures the network, logging, NTP server, and timer configurations on the switch.

Authority Admin session

Syntax **set setup system**

dns
ipv4
ipv6
logging
ntp
timers

Keywords **dns**

Prompts you in a line-by-line fashion to change DNS host name configuration parameters described in Table 14-31. To configure all system parameters, omit the keyword. For each parameter, enter a new value or press the Enter key to accept the current value.

Table 14-31. DNS Host Name Configuration Parameters

Parameter	Description
DNSClientEnabled	Enables (True) or disables (False) the DNS client.
DNSLocalHostname	Name of local DNS server
DNSServerDiscovery	DNS server boot method: 1 – Static, 2 – DHCP, 3 – DHCP version 6. The default is 1 - Static.
DNSServer1Address DNSServer2Address DNSServer3Address	IP addresses (version 4 or 6) of up to three DNS servers.
DNSSearchListDiscovery	DNS search list discovery method: ■ Static ■ DHCP for IP version 4 ■ DHCP for IP version 6
DNSSearchList1 DNSSearchList2 DNSSearchList3 DNSSearchList4 DNSSearchList5	A suffix that is appended to unqualified host names to extend the DNS search. You can specify up to five searchlists (or suffixes).

ipv4
Prompts you in a line-by-line fashion to change the switch IPv4 Ethernet configuration parameters described in Table 14-32. To configure all system parameters, omit the keyword. For each parameter, enter a new value or press the Enter key to accept the current value.

NOTE:

Changing the IP address will terminate all Ethernet management sessions.

Table 14-32. IP Version 4 Ethernet Configuration Parameters

Entry	Description
EthIPv4NetworkEnable	Enables (True) or disables (False) the IP version 4 interface. The default is True.
EthIPv4NetworkDiscovery	Ethernet boot method: 1 - Static, 2 - Bootp, 3 - DHCP, 4 - RARP. The default is 1 - Static.
EthIPv4NetworkAddress	Ethernet IP address. The default is 10.0.0.1.
EthIPv4NetworkMask	Ethernet IP subnet mask address. The default is 255.0.0.0.
EthIPv4GatewayAddress	Ethernet address gateway. The default is 10.0.0.254

ipv6
Prompts you in a line-by-line fashion to change the switch IP version 6 Ethernet configuration parameters described in Table 14-33. To configure all system parameters, omit the keyword. For each parameter, enter a new value or press the Enter key to accept the current value.

NOTE:

Changing the IP address will terminate all Ethernet management sessions.

Table 14-33. IP Version 6 Ethernet Configuration Parameters

Entry	Description
EthIPv6NetworkEnable	Enables (True) or disables (False) the IP version 6 interface. The default is True.
EthIPv6NetworkDiscovery	Ethernet boot method: 1 – Static, 2 – DHCPv6, 3 – NDP. The default is 1 - Static.
EthIPv6NetworkAddress	Ethernet IP address

Table 14-33. IP Version 6 Ethernet Configuration Parameters (Continued)

Entry	Description
EthIPv6NetworkMask	Ethernet IP subnet mask address.
EthIPv6GatewayAddress	Ethernet IP address gateway.

logging

Prompts you in a line-by-line fashion to change the event logging configuration parameters described in Table 14-34. To configure all system parameters, omit the keyword. For each parameter, enter a new value or press the Enter key to accept the current value.

Table 14-34. Event Logging Configuration Parameters

Parameter	Description
LocalLogEnabled	Enables (True) or disables (False) the saving of log information on the switch. The default is True.
RemoteLogEnabled	Enables (True) or disables (False) the recording of the switch event log on a remote host that supports the syslog protocol. The default is False.
RemoteLogHostAddress	The IP address (version 4 or 6) or DNS host name of the host that will receive the switch event log information if remote logging is enabled. The default is 10.0.0.254.

ntp

Prompts you in a line-by-line fashion to change the NTP server configuration parameters described in Table 14-35. To configure all system parameters, omit the keyword. For each parameter, enter a new value or press the Enter key to accept the current value.

Table 14-35. NTP Server Configuration Parameters

Parameter	Description
EthNetworkDiscovery	Ethernet boot method: 1 - Static, 2 - Bootp, 3 - DHCP, 4 - RARP. The default is 1 - Static.
EthNetworkAddress	Ethernet Internet Protocol (IP) address. The default is 10.0.0.1.

Table 14-35. NTP Server Configuration Parameters (Continued)

Parameter	Description
NTPClientEnabled	Enables (True) or disables (False) the Network Time Protocol (NTP) client on the switch. This client enables the switch to synchronize its time with an NTP server. This feature supports NTP version 4 and is compatible with version 3. An Ethernet connection to the server is required and you must first set an initial time and date on the switch. The synchronized time becomes effective immediately. The default is False.
NTPServerAddress	The IP address (version 4 or 6) or DNS host name of the NTP server from which the NTP client acquires the time and date. The default is 10.0.0.254.

timers

Prompts you in a line-by-line fashion to change the timer configuration parameters described in Table 14-36. To configure all system parameters, omit the keyword. For each parameter, enter a new value or press the Enter key to accept the current value.

Table 14-36. Timer Configuration Parameters

Parameter	Description
AdminTimeout	Amount of time in minutes the switch waits before terminating an idle Admin session. Zero (0) disables the time out threshold. The default is 30, the maximum is 1440.
InactivityTimeout	Amount of time in minutes the switch waits before terminating an idle Telnet command line interface session. Zero (0) disables the time out threshold. The default is 0, the maximum is 1440.

Examples

The following is an example of the Set Setup System Dns command:

```
SANbox (admin) #> set setup system dns

A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    DNSClientEnabled        False
    DNSLocalHostname        <undefined>
    DNSServerDiscovery      Static
    DNSServer1Address       <undefined>
    DNSServer2Address       <undefined>
    DNSServer3Address       <undefined>
    DNSSearchListDiscovery  Static
    DNSSearchList1          <undefined>
    DNSSearchList2          <undefined>
    DNSSearchList3          <undefined>
    DNSSearchList4          <undefined>
    DNSSearchList5          <undefined>

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    DNSClientEnabled        (True / False)               :
    DNSLocalHostname        (hostname)                   :
    DNSServerDiscovery      (1=Static, 2=Dhcp, 3=Dhcpv6) :
    DNSServer1Address       (IPv4, or IPv6 Address)      :
    DNSServer2Address       (IPv4, or IPv6 Address)      :
    DNSServer3Address       (IPv4, or IPv6 Address)      :
    DNSSearchListDiscovery  (1=Static, 2=Dhcp, 3=Dhcpv6) :
    DNSSearchList1          (domain name)                :
    DNSSearchList2          (domain name)                :
    DNSSearchList3          (domain name)                :
    DNSSearchList4          (domain name)                :
    DNSSearchList5          (domain name)                :

  Do you want to save and activate this system setup? (y/n): [n]
```

The following is an example of the Set Setup System Ipv4 command:

```
SANbox (admin) #> set setup system ipv4

A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    EthIPv4NetworkEnable    True
    EthIPv4NetworkDiscovery Static
    EthIPv4NetworkAddress   10.20.116.133
    EthIPv4NetworkMask      255.255.255.0
    EthIPv4GatewayAddress   10.20.116.1

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    EthIPv4NetworkEnable    (True / False)                      :
    EthIPv4NetworkDiscovery (1=Static, 2=Bootp, 3=Dhcp, 4=Rarp) :
    EthIPv4NetworkAddress   (dot-notated IP Address)            :
    EthIPv4NetworkMask      (dot-notated IP Address)            :
    EthIPv4GatewayAddress   (dot-notated IPv4 Address)          :

  Do you want to save and activate this system setup? (y/n): [n]
```

The following is an example of the Set Setup System Ipv6 command:

```
SANbox (admin) #> set setup system ipv6

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    EthIPv6NetworkEnable    False
    EthIPv6Discovery        Static
    EthIPv6NetworkAddress   <undefined>
    EthIPv6GatewayAddress   <undefined>

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    EthIPv6NetworkEnable    (True / False)                    :
    EthIPv6Discovery        (1=Static, 2=Dhcpv6, 3=Ndp)       :
    EthIPv6NetworkAddress   (IPv6 Address/Mask Length format) :
    EthIPv6GatewayAddress   (IPv6 Address)                    :

  Do you want to save and activate this system setup? (y/n): [n]
```

The following is an example of the Set Setup System Logging command:

```
SANbox (admin) #> set setup system logging

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    LocalLogEnabled         True
    RemoteLogEnabled        False
    RemoteLogHostAddress    10.0.0.254

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    LocalLogEnabled         (True / False)                    :
    RemoteLogEnabled        (True / False)                    :
    RemoteLogHostAddress    (hostname, IPv4, or IPv6 Address) :

  Do you want to save and activate this system setup? (y/n): [n]
```

The following is an example of the Set Setup System Ntp command:

```
SANbox (admin) #> set setup system ntp

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    NTPClientEnabled        False
    NTPServerDiscovery      Static
    NTPServerAddress        10.20.10.10

  New Value (press ENTER to accept current value, 'q' to quit, 'n' for none):
    NTPClientEnabled        (True / False)                    :
    NTPServerDiscovery      (1=Static, 2=Dhcp, 3=Dhcpv6)      :
    NTPServerAddress        (hostname, IPv4, or IPv6 Address) :

  Do you want to save and activate this system setup? (y/n): [n]
```

The following is an example of the Set Setup System Timers command:

```
SANbox (admin) #> set setup system timers

  A list of attributes with formatting and current values will follow.
  Enter a new value or simply press the ENTER key to accept the current value.
  If you wish to terminate this process before reaching the end of the list
  press 'q' or 'Q' and the ENTER key to do so.

  Current Values:
    AdminTimeout            30
    InactivityTimeout       0

  New Value (press ENTER to accept current value, 'q' to quit):
    AdminTimeout            (dec value 0-1440 minutes, 0=never) :
    InactivityTimeout       (dec value 0-1440 minutes, 0=never) :

  Do you want to save and activate this system setup? (y/n): [n]
```

Set Switch State

Changes the administrative state for all ports on the switch. The previous Set Config Switch settings are restored after a switch reset or a reactivation of a switch configuration.

Authority Admin session

Syntax **set switch state [state]**

Keywords **[state]**

[state] can be one of the following:

online

Activates and prepares the ports to send data. This is the default.

offline

Prevents the ports from receiving signal and accepting a device login.

diagnostics

Prepares the ports for testing and prevents each port from accepting a device login. When you leave the diagnostics state, the switch automatically resets.

Examples The following is an example of the Set Switch command:

```
SANbox #>admin start
SANbox (admin) #>set switch state offline
```

Set Timezone

Specifies the time zone for the switch and the workstation. The default is Universal Time (UTC) also known as Greenwich Mean Time (GMT). This keyword prompts you to choose a region, then a subregion to specify the time zone. Changing the time zone converts the currently displayed time to the time in the new time zone.

Authority Admin session

Syntax **set timezone**

Examples The following is an example of the Set Timezone command:

```
SANbox #> admin start
SANbox (admin) #> set timezone
  Africa                                America
  Antarctica                            Asia
  Atlantic                              Australia
  Europe                                Indian
  Pacific                               UTC
        Press ENTER for more options or 'q' to make a selection.

  America/Grenada                       America/Guadeloupe
  America/Guatemala                     America/Guayaquil
  America/Guyana                        America/Halifax
  America/Havana                        America/Hermosillo
  America/Indiana                       America/Indianapolis
  .
  .
  .
  America/Monterrey                     America/Montevideo
  America/Montreal                      America/Montserrat
  America/Nassau                        America/New_York
  America/Nipigon                       America/Nome
  America/Noronha                       America/North_Dakota
  America/Panama                        America/Pangnirtung

        Press ENTER for more options or 'q' to make a selection.
q
  Enter selection (or 'q' to quit): america/north_dakota
  America/North_Dakota/Center
  Enter selection (or 'q' to quit): america/north_dakota/center
```

Show About

Displays an introductory set of information about operational attributes of the switch. This command is equivalent to the Show Version command.

Authority None

Syntax **show about**

Notes Table 14-37 describes the entries in the Show About command display.

Table 14-37. Show About Display Entries

Entry	Description
SystemDescription	Switch system description
HostName	DNS host name
EthIPv4NetworkAddress	IP address, version 4
EthIPv6NetworkAddress	IP address, version 6
EthMacAddress	Switch MAC address
WorldWideName	Switch worldwide name
ChassisSerialNumber	Switch serial number
SymbolicName	Switch symbolic name
ActiveSWVersion	Firmware version
ActiveTimestamp	Date and time that the firmware was activated
POSTStatus	Results of the Power-on Self Test
LicensedPorts	Number of licensed ports
SwitchMode	Full Fabric indicates that the switch operates with the standard Fibre Channel port types: G, GL, F, FL, E.

Examples

The following is an example of the Show About command:

```
SANbox #> show about
       ***************************************************
       *                                                 *
       *       Command Line Interface SHell  (CLISH)     *
       *                                                 *
       ***************************************************

       SystemDescription         SANbox 5802V FC Switch
       HostName                  <undefined>
       EthIPv4NetworkAddress     10.20.11.192
       EthIPv6NetworkAddress     ::
       MACAddress                00:c0:dd:00:71:ee
       WorldWideName             10:00:00:c0:dd:00:71:ed
       ChassisSerialNumber       FAM033100024
       SymbolicName              SANbox
       ActiveSWVersion           V7.4.x.x.xx.xx
       ActiveTimestamp           day month date time year
       POSTStatus                Passed
       LicensedPorts             24
       SwitchMode                Full Fabric
```

Show Alarm

Displays the alarm log and session output stream display setting.

Authority None

Syntax **show alarm**
settings

Keywords ***settings***

Displays the status of the parameter that controls the display of alarms in the session output stream. This parameter is set using the Set Alarm command.

Notes The alarm log is cleared when the switch is reset or power cycled.

Examples The following is an example of the Show Alarm command:

```
SANbox #> show alarm
[1][Fri Jan 19 13:50:26.508 UTC 2007][A][1004.000F][Port: 4][Eport Isolating
due to Merge Zone Failure]
  [2][Fri Jan 19 13:50:26.513 UTC 2007][A][1004.0030][Topology change, lost
route to switch with domain ID 1]
  [3][Sun Jan 21 07:59:28.677 UTC 2007][A][1004.0030][Topology change, lost
route to switch with domain ID 99]
  [4][Sun Jan 21 07:59:29.367 UTC 2007][A][1004.0030][Topology change, lost
route to switch with domain ID 101]
```

The following is an example of the Show Alarm Settings command:

```
SANbox #> show alarm settings

  Current settings for alarm
  --------------------------
  display  ON
```

Show Broadcast

Displays the broadcast tree information and all ports that are currently transmitting and receiving broadcast frames.

Authority None

Syntax **show broadcast**

Examples The following is an example of the Show Broadcast command:

```
SANbox #> show broadcast

  Group Member Ports ISL Ports
  ----- ------------ ---------
  0     3            16
        15
        16
```

Show Chassis

Displays chassis component status and temperature.

Authority None

Syntax **show chassis**

Examples The following is an example of the Show Chassis command for model 5602.

```
SANbox #> show chassis
  Chassis Information
  -------------------
  BoardTemp (1) - Degrees Celsius   36
  FanStatus (1)                     Good
  FanStatus (2)                     Good
  FanDirection (1)                  BackToFront
  FanDirection (2)                  BackToFront
  PowerSupplyStatus (1)             Good
  PowerSupplyStatus (2)             Good
  HeartBeatCode                     1
  HeartBeatStatus                   Normal
```

Show Config Port

Displays configuration parameters for one or more ports.

Authority None

Syntax **show config port *[port_number]***

Keywords ***[port_number]***

The number of the port. Ports are numbered beginning with 0. If you omit [port_number], all ports are specified.

Examples The following is an example of the Show Config Port command for port 3:

```
SANbox #> show config port 3

  Configuration Name: default
  ---------------------------

  Port Number: 3
  ------------
  AdminState         Offline
  LinkSpeed          Auto
  PortType           GL
  SymbolicName       Port3
  ALFairness         False
  DeviceScanEnabled  True
  ForceOfflineRSCN   False
  ARB_FF             False
  InteropCredit      0
  ExtCredit          0
  FANEnabled         True
  AutoPerfTuning     False
  LCFEnabled         False
  MFSEnabled         True
  VIEnabled          False
  MSEnabled          True
  NoClose            False
  IOStreamGuard      Disabled
  PDISCPingEnable    True
```

The following is an example of the Show Config Port command for an XPAK port:

```
SANbox #> show config port 20
Configuration Name: default
  -------------------
  Port Number: 16
  ------------
  AdminState          Online
  LinkSpeed           10Gb/s
  PortType            G
  SymbolicName        10G-20
  DeviceScanEnabled   True
  ForceOfflineRSCN    False
  AutoPerfTuning      False
  LCFEnabled          False
  MFSEnabled          False
  MSEnabled           True
  IOStreamGuard       Disabled
  VIEnabled           False
  PDISCPingEnabled    True
```

Show Config Security

Displays the security database configuration parameters.

Authority None

Syntax **show config security**

Examples The following is an example of the Show Config Security command:

```
SANbox #> show config security

  Configuration Name: default
  -------------------

  Switch Security Configuration Information
  -----------------------------------------
  FabricBindingEnabled  False
  AutoSave              True

  Port  Binding Status  WWN
  ----  --------------  ---
  0       True          10:20:30:40:50:60:70:80
  1       True          10:20:30:40:50:60:70:80
  2       False         No port binding entries found.
  3       True          10:20:30:40:50:60:70:80
  4       True          10:20:30:40:50:60:70:80
  5       False         No port binding entries found.
  6       True          10:20:30:40:50:60:70:81
  7       False         No port binding entries found.
  8       True          10:20:30:40:50:60:70:80
  9       False         No port binding entries found.
  10      False         No port binding entries found.
  11      False         No port binding entries found.
  12      False         No port binding entries found.
  13      False         No port binding entries found.
  14      False         No port binding entries found.
  15      False         No port binding entries found.
  16      False         No port binding entries found.
  17      False         No port binding entries found.
  18      False         No port binding entries found.
  19      False         No port binding entries found.
  20      False         No port binding entries found.
  21      False         No port binding entries found.
  22      False         No port binding entries found.
  23      False         No port binding entries found.
```

Show Config Security Portbinding

Displays the port binding configuration for one or more ports.

Authority None

Syntax **show config security portbinding *[port_number]***

Keywords ***[port_number]***

The number of the port. If you omit [port_number], the port binding configuration for all ports is displayed.

Examples The following is an example of the Show Config Security Portbinding command:

```
SANbox #> show config security portbinding

  Configuration Name: default
  -------------------

  Port  Binding Status  WWN
  ----  --------------  ---
  0       True          10:20:30:40:50:60:70:80
  1       True          10:20:30:40:50:60:70:80
  2       False         No port binding entries found.
  3       True          10:20:30:40:50:60:70:80
  4       True          10:20:30:40:50:60:70:80
  5       False         No port binding entries found.
  6       True          10:20:30:40:50:60:70:81
  7       False         No port binding entries found.
  8       True          10:20:30:40:50:60:70:80
  9       False         No port binding entries found.
  10      False         No port binding entries found.
  11      False         No port binding entries found.
  12      False         No port binding entries found.
  13      False         No port binding entries found.
  14      False         No port binding entries found.
  15      False         No port binding entries found.
  16      False         No port binding entries found.
  17      False         No port binding entries found.
  18      False         No port binding entries found.
  19      False         No port binding entries found.
  20      False         No port binding entries found.
  21      False         No port binding entries found.
  22      False         No port binding entries found.
  23      False         No port binding entries found.
```

Show Config Switch

Displays the switch configuration parameters.

Authority None

Syntax **show config switch**

Examples The following is an example of the Show Config Switch command:

```
SANbox #> show config switch
 Configuration Name: default
 ------------------
  Switch Configuration Information
  --------------------------------
  AdminState            Online
  BroadcastEnabled      False
  InbandEnabled         True
  FDMIEnabled           False
  FDMIEntries           10
  DefaultDomainID       19 (0x13)
  DomainIDLock          True
  SymbolicName          sw108
  R_A_TOV               10000
  E_D_TOV               2000
  PrincipalPriority     254
  ConfigDescription     Default Config
  ConfigLastSavedBy     admin@OB-session5
  ConfigLastSavedOn     day month date time year
  InteropMode           Standard
```

Show Config Threshold

Displays alarm threshold parameters for the switch.

Authority None

Syntax **show config threshold**

Examples The following is an example of the Show Config Threshold command:

```
SANbox #> show config threshold
  Configuration Name: default
  ------------
  Threshold Configuration Information
  ----------------------------------
  ThresholdMonitoringEnabled      False
  CRCErrorsMonitoringEnabled      True
    RisingTrigger                 25
    FallingTrigger                1
    SampleWindow                  10
  DecodeErrorsMonitoringEnabled   True
    RisingTrigger                 25
    FallingTrigger                0
    SampleWindow                  10
  ISLMonitoringEnabled            True
    RisingTrigger                 2
    FallingTrigger                0
    SampleWindow                  10
  LoginMonitoringEnabled          True
    RisingTrigger                 5
    FallingTrigger                1
    SampleWindow                  10
  LogoutMonitoringEnabled         True
    RisingTrigger                 5
    FallingTrigger                1
    SampleWindow                  10
  LOSMonitoringEnabled            True
    RisingTrigger                 100
    FallingTrigger                5
    SampleWindow                  10
```

Show Config Zoning

Displays zoning configuration parameters for the switch.

Authority None

Syntax **show config zoning**

Examples The following is an example of the Show Config Zoning command:

```
SANbox #> show config zoning

 Configuration Name: default
  -------------------

  Zoning Configuration Information
  --------------------------------
  MergeAutoSave         True
  DefaultZone           Allow
  DiscardInactive       False
```

Show Domains

Displays list of each domain and its worldwide name in the fabric.

Authority None

Syntax **show domains**

Examples The following is an example of the Show Domains command:

```
SANbox #> show domains
  Principal switch is (remote): 10:00:00:60:69:50:0b:6c
  Upstream Principal ISL is   : 1
  Domain ID List:
        Domain 97  (0x61)  WWN = 10:00:00:c0:dd:00:71:ed
        Domain 98  (0x62)  WWN = 10:00:00:60:df:22:2e:0c
        Domain 99  (0x63)  WWN = 10:00:00:c0:dd:00:72:45
        Domain 100 (0x64)  WWN = 10:00:00:c0:dd:00:ba:68
        Domain 101 (0x65)  WWN = 10:00:00:60:df:22:2e:06
        Domain 102 (0x66)  WWN = 10:00:00:c0:dd:00:90:ef
        Domain 103 (0x67)  WWN = 10:00:00:60:69:50:0b:6c
        Domain 104 (0x68)  WWN = 10:00:00:c0:dd:00:b8:b7
```

Show Donor

Displays list of current donors and extended credit configuration for all ports.

Authority None

Syntax **show donor**

```
SANbox #> show donor

  Port    Config Ext Credit Max Credit Donated Member of   Valid Groups to
  Number  Type   Requested  Available  to Port Donor Group Extend Credit
  ------  ------ ---------- ---------- ------- ----------- ---------------
  0       GL     0          16         None    0           0
  1       GL     0          16         None    0           0
  2       GL     0          16         None    0           0
  3       GL     0          16         None    0           0
  4       GL     0          16         None    0           0
  5       GL     0          16         None    0           0
  6       GL     0          16         None    0           0
  7       GL     0          16         None    0           0
  8       GL     0          16         None    0           0
  9       GL     0          16         None    0           0
  10      GL     0          16         None    0           0
  11      GL     0          16         None    0           0
  12      GL     0          16         None    0           0
  13      GL     0          16         None    0           0
  14      GL     0          16         None    0           0
  15      GL     0          16         None    0           0
  16      GL     0          16         None    0           0
  17      GL     0          16         None    0           0
  18      GL     0          16         None    0           0
  19      GL     0          16         None    0           0
  20      G      0          16         None    None        None
  21      G      0          16         None    None        None
  22      G      0          16         None    None        None
  23      G      0          16         None    None        None
  Donor Group  Credit Pool
  -----------  -----------
  0            0
```

Show Fabric

Displays list of each domain, symbolic name, worldwide name, node IP address, and port IP address in the fabric.

Authority None

Syntax **show fabric *brief***

Keywords **brief**

Displays a table of switches in the fabric including domain ID, WWN, and symbolic name. If you omit the Brief keyword, the command displays information for the local switch only.

Examples The following is an example of the Show Fabric command:

```
SANbox #> show fabric
  Domain           *133(0x85)
  WWN              10:00:00:c0:dd:0d:53:91
  SymbolicName     SANbox
  HostName         <undefined>
  EthIPv4Address   10.20.116.133
  EthIPv6Address   <undefined>

  * indicates principal switch
```

The following is an example of the Show Fabric Brief command:

```
SANbox #> show fabric brief
 Domain     WWN                     SymbolicName
 ------     ---                     ------------
*16 (0x10)  10:00:00:c0:dd:00:77:81 swsb1.11
 17 (0x11)  10:00:00:c0:dd:00:6a:2d sw12
 18 (0x12)  10:00:00:c0:dd:00:c3:04 sw.160
 19 (0x13)  10:00:00:c0:dd:00:bc:56 Sb2.108

  * indicates principal switch
```

Show FDMI

Displays detailed information about the device host bus adapter.

Authority None

Syntax **show fdmi *[port_wwn]***

Keywords ***[port_wwn]***

The device worldwide port name for which to display information. If you omit [port_wwn], the command displays a summary of host bus adapter information for all attached devices in the fabric. Illegal characters in the display appear as question marks (?).

Examples The following is an example of the Show FDMI command:

```
SANbox #> show fdmi
HBA ID                  PortID  Manufacturer           Model    Ports
--------                ------  ---------------       -------   -----
21:01:00:e0:8b:27:aa:bc 610000  QLogic Corporation    QLA2342   2
21:00:00:00:ca:25:9b:96 180100  QLogic Corporation    QL2330    2
```

The following is an example of the Show FDMI WWN command:

```
SANbox #> show fdmi 21:00:00:e0:8b:09:3b:17
  FDMI Information
  ----------------
  Manufacturer            QLogic Corporation
  SerialNumber            [04202
  Model                   QLA2342
  ModelDescription        QLogic QLA2342 PCI Fibre Channel Adapter
  PortID                  610000
  NodeWWN                 20:00:00:e0:8b:07:aa:bc
  HardwareVersion         FC5010409-10
  DriverVersion           8.2.3.10 Beta 2 (W2K VI)
  OptionRomVersion        1.21
  FirmwareVersion         03.02.13.
  OperatingSystem         SunOS 5.8
  MaximumCTPayload        2040
  NumberOfPorts           1

  Port  21:01:00:e0:8b:27:aa:bc

  SupportedFC4Types       FCP
  SupportedSpeed          2Gb/s
  CurrentSpeed            2Gb/s
  MaximumFrameSize        2048
  OSDeviceName
  HostName
```

Show Interface

Displays the status of the active network interfaces.

Authority None

Syntax **show interface**

Examples The following is an example of the Show Interface command:

```
SANbox #> show interface
eth0      Link encap:Ethernet  HWaddr 00:C0:DD:00:00:27
          inet addr:10.20.116.131  Bcast:10.20.116.255  Mask:255.255.255.0
          inet6 addr: fd70:c154:c2df:116:2c0:ddff:fe00:27/64 Scope:Global
          inet6 addr: fe80::2c0:ddff:fe00:27/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:137168 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2194 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:47764214 (45.5 Mb)  TX bytes:328639 (320.9 Kb)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.255.255.255
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:3887 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3887 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:272461 (266.0 Kb)  TX bytes:272461 (266.0 Kb)
```

Show Log

Displays the contents of the log or the parameters used to create and display entries in the log. The log contains a maximum of 1200 entries. When the log reaches its entry capacity, subsequent entries overwrite the existing entries, beginning with the oldest.

Authority None

Syntax **show log**
[number_of_events]
component
display [filter]
level
options
port
settings

Keywords **[number_of_events]**

Specifies the number of the most recent events to display from the event log. [number_of_events] must be a positive integer.

component

Displays the components currently being monitored for events. Table 14-38 describes the log monitoring components.

Table 14-38. Log Monitoring Components

Component	Description
Chassis	Chassis hardware components such as fans and power supplies
CLI	Command line interface events
Eport	E_Port events
Mgmtserver	Management server events
Nameserver	Name server events
Other	Miscellaneous events
Port	Port events
QFS	QLogic Fabric Service events. QFS governs Call Home e-mail notification.
SNMP	SNMP events

Table 14-38. Log Monitoring Components (Continued)

Component	Description
Switch	Switch management events
Zoning	Zoning conflict events

display [filter]

Displays log events on the screen according to the component or severity level filter given by [filter]. [filter] can be one of the following:

Info

Displays all informative events.

Warning

Displays all warning events.

Critical

Displays all critical events.

Eport3

Displays all events related to E_Ports.

Mgmtserver

Displays all events related to the management server.

Nameserver

Displays all events related to the name server.

Port [port_number]

Displays all events related to the port given by [port_number].

SNMP

Displays all events related to SNMP.

Switch

Displays all events related to switch management.

Zoning

Displays all events related to zoning.

level

Displays the severity settings for event logging and the setting for the display level.

options

Displays the options that are available for configuring event logging and automatic display to the screen. Refer to the "Set Log" command on page 14-101 for information about how to configure event logging and display level.

port

Displays the ports being monitored for events. If an event occurs that is of the defined level and on a defined component, but is not on a defined port, no entry is made in the log.

settings

Displays the current filter settings for component, severity level, port, and display level. This command is equivalent to executing the following commands separately: Show Log Component, Show Log Level, and Show Log Port.

Examples

The following is an example of the Show Log Component command:

```
SANbox #> show log component
Current settings for log
   ------------------------
   FilterComponent   NameServer MgmtServer Zoning Switch Blade Port Eport Snmp
```

The following is an example of the Show Log Level command:

```
SANbox #> show log level
   Current settings for log
   ------------------------
   FilterLevel       Info
   DisplayLevel      Critical
```

The following is an example of the Show Log Options command:

```
SANbox #> show log options
  Allowed options for log
  -----------------------
   FilterComponent   All,None,NameServer,MgmtServer,Zoning,Switch,Blade,Port,Eport,Snmp,CLI,Qfs
   FilterLevel       Critical,Warn,Info,None
   DisplayLevel      Critical,Warn,Info,None
```

The following is an example of the Show Log command:

```
SANbox #> show log
   [327][day month date time year][I][Eport Port:0/8][Eport State=
   E_A0_GET_DOMAIN_ID]
   [328][day month date time year][I][Eport Port: 0/8][FSPF PortUp state=0]
   [329][day month date time year][I][Eport Port: 0/8][Sending init hello]
   [330][day month date time year][I][Eport Port: 0/8][Processing EFP, oxid= 0x8]
   [331][day month date time year][I][Eport Port: 0/8][Eport State = E_A2_IDLE]
   [332][day month date time year][I][Eport Port: 0/8][EFP,WWN= 0x100000c0dd00b845,
   len= 0x30]
   [333][day month date time year][I][Eport Port: 0/8][Sending LSU oxid=0xc:type=1]
   [334][day month date time year][I][Eport Port: 0/8][Send Zone Merge Request]
   [335][day month date time year][I][Eport Port: 0/8][LSDB Xchg timer set]
```

Show LSDB

Displays Link State database information,

Authority None

Syntax **show lsdb**

Examples The following is an example of the Show LSDB command:

```
SANbox #> show lsdb

  Link State Database Information
  -------------------------------
  LsID 34:  Age=1176, Incarnation=0x800000e5
    NeighborDomain=36, LocalPort=6, RemotePort=7, Cost=500
    NeighborDomain=35, LocalPort=16, RemotePort=16, Cost=100
    NeighborDomain=35, LocalPort=18, RemotePort=19, Cost=100
    NeighborDomain=35, LocalPort=7, RemotePort=7, Cost=500
    NeighborDomain=35, LocalPort=5, RemotePort=4, Cost=500

    Local Domain

  LsID 35:  Age=1166, Incarnation=0x800000cc
    NeighborDomain=34, LocalPort=16, RemotePort=16, Cost=100
    NeighborDomain=34, LocalPort=19, RemotePort=18, Cost=100
    NeighborDomain=36, LocalPort=5, RemotePort=4, Cost=250
    NeighborDomain=34, LocalPort=7, RemotePort=7, Cost=500
    NeighborDomain=34, LocalPort=4, RemotePort=5, Cost=500

    Route: OutPort=18, Hops=1, Cost=100

  LsID 36:  Age=1162, Incarnation=0x80000046
    NeighborDomain=34, LocalPort=7, RemotePort=6, Cost=500
    NeighborDomain=35, LocalPort=4, RemotePort=5, Cost=250

    Route: OutPort=16, Hops=2, Cost=350
```

Show Media

NOTE:

This command requires the SANdoctor license key. To purchase a license key, contact your authorized maintenance provider or authorized reseller.

Displays transceiver operational and diagnostic information for one or more ports.

Authority None

Syntax **show media**

[port_list]

all

installed

Keywords **[port_list]**

The port or ports for which to display transceiver information. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15.

all

Displays transceiver information for all ports.

installed

Displays transceiver information for all ports that have transceivers installed.

Notes Table 14-39 describes the transceiver information in the Show Media display.

Table 14-39. Transceiver Information

Information Type	Description
MediaType	Media physical variant. The variant indicates speed, media, transmitter, and distance. The media designator may be M5 (multimode 50 micron), M6 (multimode 62.5 micron), or MX. MX indicates that the media supports both multimode 50 and 62.5 micron. MediaType may also be on of the following: ■ NotInstalled–transceiver is not installed. ■ Unknown–transceiver does not have a serial ID. ■ NotApplicable–transceiver is not needed.
MediaVendor	Vendor name

Table 14-39. Transceiver Information (Continued)

Information Type	Description
MediaPartNumber	Vendor media part number
MediaRevision	Vender media revision level
MediaSerialNumber	Vendor media serial number
MediaSpeeds	Transmission speed capabilities
Temp	Temperature in degrees Celsius.
Voltage	Supply voltage in Volts. The range is 0–6.55.
Tx Bias	Transmitter laster bias current in milliamps. The range is 0–655.
Tx Power	Transmitter coupled output power in milliWatts. The range is 0–6.55.
Rx Power	Received optical power in milliWatts. The range is 0–6.55.
Value	Measured value.
Status	State associated with the measured value: ■ Normal: Value is in the normal operating range. ■ HighAlarm: Value exceeds the high alarm threshold. ■ HighWarning: Value exceeds the high warning threshold. ■ LowWarning: Value is less than the low warning threshold. ■ LowAlarm: Value is less than the low alarm threshold.
HighAlarm	Vendor specified threshold above which an alarm is issued.
HighWarning	Vendor specified threshold above which a warning is issued.
LowWarning	Vendor specified threshold below which a warning is issued.
LowAlarm	Vendor specified threshold below which an alarm is issued.

Examples

The following is an example of the Show Media command for port 4:

```
SANbox #> show media 4
Port Number: 4
-------------
MediaType           400-M5-SN-I
MediaVendor         FINISAR CORP.
MediaPartNumber     FTRJ8524P2BNL
MediaRevision       A
MediaSerialNumber   P6G22RL
MediaSpeeds         1Gb/s, 2Gb/s, 4Gb/s

                      Temp      Voltage      Tx Bias      Tx Pwr      Rx Pwr
                       (C)          (V)         (mA)        (mW)        (mW)
                 ---------- ---------- ------------ ---------- ----------
       Value          37.32       3.33         7.30       0.373       0.000
       Status        Normal HighWarning       Normal      Normal    LowAlarm
       HighAlarm      95.00       3.90        17.00       0.637       1.264
       HighWarning    90.00       3.70        14.00       0.637       0.791
       LowWarning    -20.00       2.90         2.00       0.082       0.028
       LowAlarm      -25.00       2.70         1.00       0.073       0.019
```

The following is an example of the Show Media command for all ports:

```
SANbox #> show media
Note: -- LowAlarm; - LowWarning; + HighWarning; ++ HighAlarm
Port Vendor Name     Temp    Voltage Tx Bias Tx Pwr Rx Pwr
Num                  (C)     (V)     (mA)    (mW)   (mW)
---- -----------     ------- ------- ------- ------ ------
0    NotInstalled     N/A     N/A     N/A     N/A    N/A
1    NotApplicable    N/A     N/A     N/A     N/A    N/A
2    Unknown          N/A     N/A     N/A     N/A    N/A
3    FINISAR          N/A     N/A     N/A     N/A    N/A
4    FINISAR         37.32   3.33+   7.30    0.371  0.000 --
5    FINISAR         37.32   3.33+   7.30    0.371  0.000 --
6    FINISAR         37.32   3.33+   7.30    0.371  0.000 --
7    FINISAR         37.32   3.33+   7.30    0.371  0.000 --
8    FINISAR         37.32   3.33+   7.30    0.371  0.000 --
9    FINISAR         37.32   3.33+   7.30    0.371  0.000 --
10   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
11   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
12   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
13   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
14   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
15   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
16   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
17   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
18   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
19   FINISAR         37.32   3.33+   7.30    0.371  0.000 --
20   Unknown          N/A     N/A     N/A     N/A    N/A
21   INFINEON         N/A     N/A     N/A     N/A    N/A
22   INFINEON        39.62    N/A    5.84    0.637  0.092
23   INFINEON        39.62    N/A    5.84    0.637  0.092
```

Show Mem

Displays information about memory activity.

Authority None

Syntax **show mem *[count]***

Keywords ***[count]***

The number of seconds for which to display memory information. If you omit [count], the value 1 is used. Displayed memory values are in 1K block units.

NOTE:

This keyword will display memory activity updates until [count] is reached–it cannot be interrupted. Therefore, avoid using large values for [count].

Examples The following is an example of the Show Mem command:

```
SANbox #> show mem

procs -----------memory---------- ---swap-- -----io---- --system-- ----cpu----
 r  b   swpd   free   buff  cache   si   so    bi    bo   in    cs us sy id wa
 1  0      0 334464  55932  18728    0    0     1     0  401    57  1  2 97  0

Filesystem space in use: 41138/53188 KB (77%)
```

Show Ns

Displays the WWNs for devices in the fabric.

Authority None

Syntax **show ns *[option]***

Keywords ***[option]***

The domain IDs or port IDs for which to display name server information. If you omit [option], name server information for the local domain ID is displayed. [option] can have the following values:

all

Displays WWNs for all switches and ports.

[domain_id]

Displays WWNs for all devices connected to the switch given by [domain_id]. [domain_id] is a switch domain ID.

[port_id]

Displays the WWNs for the devices connected to the port given by [port_id]. [port_id] is a port Fibre Channel address.

Examples The following is an example of the Show Ns (local domain) command:

```
SANbox #> show ns
  Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  1   19 (0x13) 1301e1 NL   3   21:00:00:20:37:73:13:69 20:00:00:20:37:73:13:69
  2   19 (0x13) 1301e2 NL   3   21:00:00:20:37:73:12:9b 20:00:00:20:37:73:12:9b
  3   19 (0x13) 1301e4 NL   3   21:00:00:20:37:73:05:26 20:00:00:20:37:73:05:26
  4   19 (0x13) 130d00 N    3   21:01:00:e0:8b:27:a7:bc 20:01:00:e0:8b:27:a7:bc
```

The following is an example of the Show Ns [domain_ID] command:

```
SANbox #> show ns 18
  Seq Domain    Port   Port
  No  ID        ID     Type COS PortWWN                 NodeWWN
  --- ------    ------ ---- --- -------                 -------
  1   18 (0x12) 120700 N    3   21:00:00:e0:8b:07:a7:bc 20:00:00:e0:8b:07:a7:bc
```

The following is an example of the Show Ns [port_ID] command:

```
SANbox #> show ns 1301e1
  Port ID: 1301e1
  --------
  PortType          NL
  PortWWN           21:00:00:20:37:73:13:69
  SymbolicPortName
  NodeWWN           20:00:00:20:37:73:13:69
  SymbolicNodeName
  NodeIPAddress     diskarray7.anycompany.com
  ClassOfService    3
  PortIPAddress     ::
  FabricPortName    20:01:00:c0:dd:00:bc:56
  FC4Type           FCP
  FC4Desc           (NULL)
```

Show Pagebreak

Displays the current pagebreak setting.

Authority None

Syntax **show pagebreak**

Notes The pagebreak setting limits the display of information to 20 lines (On) or allows the continuous display of information without a break (Off).

Examples The following is an example of the Show Pagebreak command:

```
SANbox #> show pagebreak

  current setting: ON
```

Show Perf

Displays port performance in frames/second and bytes/second. If you omit the keyword, the command displays data transmitted (out), data received (in), and total data transmitted and received in frames/second and bytes/second. Transmission rates are expressed in thousands (K) and millions (M).

Authority None

Syntax

show perf *[port_list]*

or

show perf

byte *[port_list]*
inbyte *[port_list]*
outbyte *[port_list]*
frame *[port_list]*
inframe *[port_list]*
outframe *[port_list]*
errors *[port_list]*

Keywords ***[port_list]***

Displays the instantaneous performance data for up to sixteen ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for all ports.

byte *[port_list]*

Displays continuous performance data in total bytes/second transmitted and received for up to sixteen ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

inbyte *[port_list]*

Displays continuous performance data in bytes/second received for the ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

outbyte *[port_list]*

Displays continuous performance data in bytes/second transmitted for the ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

frame *[port_list]*

Displays continuous performance data in total frames/second transmitted and received for the ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

inframe *[port_list]*

Displays continuous performance data in frames/second received for the ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

outframe *[port_list]*

Displays continuous performance data in frames/second transmitted for the ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

errors *[port_list]*

Displays continuous error counts for the ports given by [port_list]. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15. If you omit [port_list], the command displays performance data for ports 0–15. Press any key to stop the display.

Examples

The following is an example of the Show Perf command:

```
SANbox #> show perf
  Port   Bytes/s    Bytes/s    Bytes/s    Frames/s   Frames/s   Frames/s
  Number   (in)       (out)    (total)      (in)       (out)    (total)
  ------ -------    -------    -------    --------   --------   --------
  0      7K         136M       136M       245        68K        68K
  1      58K        0          58K        1K         0          1K
  2      0          0          0          0          0          0
  3      0          0          0          0          0          0
  4      0          0          0          0          0          0
  5      0          0          0          0          0          0
  6      0          7K         7K         0          245        245
  7      136M       58K        136M       68K        1K         70K
  8      7K         136M       136M       245        68K        68K
  9      58K        0          58K        1K         0          1K
  10     0          0          0          0          0          0
  11     0          0          0          0          0          0
  12     0          0          0          0          0          0
  13     0          0          0          0          0          0
  14     0          7K         7K         0          245        245
  15     136M       58K        136M       68K        1K         70K
  16     47M        23K        47M        23K        726        24K
  17     0          0          0          0          0          0
  18     23K        47M        47M        726        23K        24K
  19     0          0          0          0          0          0
  20     0          0          0          0          0          0
  21     0          0          0          0          0          0
  22     0          0          0          0          0          0
  23     0          0          0          0          0          0
```

The following is an example of the Show Perf Byte command:

```
SANbox #> show perf byte
Displaying bytes/sec (total)...  (Press any key to stop display)

  0    1    2    3    4    5    6    7    8    9    10   11   12   13   14   15
  ------------------------------------------------------------------------------
  0    0    0    0    0    0    0    0    137M 58K  0    0    0    0    8K   137M
  0    0    0    0    0    0    0    0    136M 58K  0    0    0    0    8K   136M
  0    0    0    0    0    0    0    0    135M 58K  0    0    0    0    7K   135M
  0    0    0    0    0    0    0    0    137M 58K  0    0    0    0    8K   137M
  0    0    0    0    0    0    0    0    136M 58K  0    0    0    0    7K   136M
  0    0    0    0    0    0    0    0    137M 58K  0    0    0    0    8K   137M
  0    0    0    0    0    0    0    0    136M 58K  0    0    0    0    8K   136M
  0    0    0    0    0    0    0    0    136M 58K  0    0    0    0    7K   136M
q
```

Show Port

Displays operational information for one or more ports.

Authority None

Syntax **show port**
[port_list]

Keywords **[port_list]**
The number of the port for which to display information. [port_list] can be a set of port numbers and ranges delimited by spaces. For example, [0 2 10-15] specifies ports 0, 2, 10, 11, 12, 13, 14, and 15.

Notes Table 14-40 describes the port parameters.

Table 14-40. Show Port Parameters

Entry	Description
AdminState	Administrative state
AIinit	Number of times the port began arbitrated loop initialization.
AIinitError	Number of times the port entered initialization and the initialization failed.
AsicNumber	ASIC number
AsicPort	ASIC port number
BadFrames	Number of frames that have framing errors.
BBCR_FrameFailures	Number of times more frames were lost during a credit recovery period than the recovery process could resolve. This causes a Link Reset to recover the credits.
BBCR_RRDYFailures	Number of times more R_RDYs were lost during a credit recovery period than the recovery process could resolve. This causes a Link Reset to recover the credits.
ClassXFramesIn	Number of class *x* frames received by this port.
ClassXFramesOut	Number of class *x* frames sent by this port.
ClassXWordsIn	Number of class *x* words received by this port.
ClassXWordsOut	Number of class *x* words sent by this port.
ClassXToss	Number of times an SOFi3 or SOFn3 frame is tossed from TBUF.
ConfigType	Configured port type

Table 14-40. Show Port Parameters (Continued)

Entry	Description
DecodeError	Number of decode errors detected
DownstreamISL	Downstream ISL state. True indicates a connection to another switch that is not the principal switch.
POSTFaultCode	Fault code from the most recent Power-on self test
POSTStatus	Status from the most recent Power-on self test
EpConnects	Number of times an E_Port connected through ISL negotiation.
EpConnState	E_Port connection status
EpIsoReason	E_Port isolation reason
FBusy	Number of times the switch sent a F_BSY because Class 2 frame could not be delivered within ED_TOV time. The number of class 2 and class 3 fabric busy (F_BSY) frames generated by this port in response to inbound frames. This usually indicates a busy condition on the fabric or N_Port that is preventing delivery of this frame.
Flowerrors	Number of frames received there were no available credits.
FReject	Number of frames from devices that were rejected.
InvalidCRC	Invalid CRC detected.
InvalidDestAddr	Invalid destination address detected.
IOStreamGuard	I/O StreamGuard status
Licensed	Port activation status
LinkFailures	Number of optical link failures detected by this port. A link failure is a loss of synchronization or a loss of signal while not in the offline state. A loss of signal causes the switch to attempt to re-establish the link. If the link is not re-established, a link failure is counted. A link reset is performed after a link failure.
LinkSpeed	Port transmission speed
LinkState	Port activity status
LIP_AL_PD_ALPS	Number of F7, AL_PS LIPs, or AL_PD (vendor specific) resets, performed.
LIP_F7_AL_PS	This LIP is used to reinitialize the loop. An L_Port, identified by AL_PS, may have noticed a performance degradation and is trying to restore the loop.

Table 14-40. Show Port Parameters (Continued)

Entry	Description
LIP_F8_AL_PS	This LIP denotes a loop failure detected by the L_Port identified by AL_PS.
LIP_F7_F7	A loop initialization primitive frame used to acquire a valid AL_PA.
LIP_F8_F7	A loop initialization primitive frame used to indicate that a loop failure has been detected at the receiver.
Login	Number of device logins
LoginStatus	Device login status for the port: LoggedIn or NotLoggedIn
Logout	Number of device logouts that have occurred on the port
LongFramesIn	Number of incidents when one or more frames that are greater than the maximum size were received
LoopTimeouts	A two (2) second timeout, as specified by FC-AL-2.
LossOfSync	Number of synchronization losses (>100 ms) detected by this port. A loss of synchronization is detected by the receipt of an invalid transmission word.
LostFrames	Number of incidents of lost frames.
LostRRDYs	Number of incidents of lost Receiver_Ready (R_RDY) primitives
MaxCredit	Maximum number of port buffer credits
MediaSpeeds	Possible transmission speeds for the port
MediaPartNumber	Transceiver vendor part number
MediaRevision	Transceiver revision
MediaType	Media physical variant. The variant indicates speed, media, transmitter, and distance. The media designator may be M5 (multimode 50 micron), M6 (multimode 62.5 micron), or MX. MX indicates that the media supports both multimode 50 and 62.5 micron.
MediaVendor	Transceiver manufacturer
MediaVendorID	Transceiver manufacturer identifier
OperationalState	Operational state
PerfTuningMode	AutoPerfTuning status
PortID	Fibre Channel port address

Table 14-40. Show Port Parameters (Continued)

Entry	Description
PortWWN	Worldwide port name
PrimSeqErrors	Number of primitive sequence errors detected
RunningType	Operational port type: F, FL, E, or Unknown
RxLinkResets	Number of link reset primitives received from an attached device.
RxOfflineSeq	Number of offline sequences (OLSs) received. An OLS is issued for link initialization, a Receive & Recognize Not_Operational (NOS) state, or to enter the offline state.
ShortFramesIn	Number of incidents when one or more frames that are less than the minimum size were received
SymbolicName	Port symbolic name
SyncStatus	Synchronization status: SyncAcquired, SyncLost
TestFaultCode	Fault code from the most recent port test
TestStatus	Status from the most recent port test
TotalErrors	Total number of errors detected on the port since the last port or switch reset
TotalLinkResets	Total number of link resets since the last port or switch reset
TotalLIPsRecvd	Number of loop initialization primitive frames received by this port.
TotalLIPsXmitd	Number of loop initialization primitive frames transmitted by this port.
TotalOfflineSeq	Total number of Offline Sequences issued and received by this port.
TotalRxFrames	Total number of frames received by this port.
TotalRxWords	Total number of words received by this port.
TotalTxFrames	Total number of frames issued by this port.
TotalTxWords	Total number of words issued by this port.
TxLinkResets	Number of Link Resets issued by this port.
TxOfflineSeq	Number of Offline Sequences issued by this port.
XmitterEnabled	Transmitter status: True, False

Examples

The following is an example of the Show Port command:

```
SANbox #> show port 1
  Port Number: 1
  ------------
  AdminState       Online              OperationalState Offline
  AsicNumber       0                   PerfTuningMode   Normal
  AsicPort         2                   PortID           3a0100
  ConfigType       GL                  PortWWN          20:01:00:c0:dd:0d:4f:08
  POSTFaultCode    00000000            RunningType      Unknown
  POSTStatus       Passed              MediaPartNumber  FTLF8528P2BCV
  DownstreamISL    False               MediaRevision    A
  EpConnState      None                MediaType        800-MX-SN-S
  EpIsoReason      NotApplicable       MediaVendor      FINISAR CORP.
  IOStreamGuard    Disabled            MediaVendorID    00009065
  Licensed         True                SymbolicName     Port1
  LinkSpeed        Auto                SyncStatus       SyncLost
  LinkState        Inactive            TestFaultCode    00000000
  LoginStatus      NotLoggedIn         TestStatus       NeverRun
  MaxCredit        16                  UpstreamISL      False
  MediaSpeeds      2Gb/s, 4Gb/s, 8Gb/s XmitterEnabled   True

  ALInit             1                   LIP_F8_F7          0
  ALInitError        0                   LinkFailures       0
  BadFrames          0                   Login              0
  BBCR_FrameFailures 0                   Logout             0
  BBCR_RRDYFailures  0                   LongFramesIn       0
  Class2FramesIn     0                   LoopTimeouts       0
  Class2FramesOut    0                   LossOfSync         0
  Class2WordsIn      0                   LostFrames         0
  Class2WordsOut     0                   LostRRDYs          0
  Class3FramesIn     0                   PrimSeqErrors      0
  Class3FramesOut    0                   RxLinkResets       0
  Class3Toss         0                   RxOfflineSeq       0
  Class3WordsIn      0                   ShortFramesIn      0
  Class3WordsOut     0                   TotalErrors        0
  DecodeErrors       0                   TotalLinkResets    0
  EpConnects         0                   TotalLIPsRecvd     0
  FBusy              0                   TotalLIPsXmitd     2
  FlowErrors         0                   TotalOfflineSeq    0
  FReject            0                   TotalRxFrames      0
  InvalidCRC         0                   TotalRxWords       0
  InvalidDestAddr    0                   TotalTxFrames      0
  LIP_AL_PD_AL_PS    0                   TotalTxWords       0
  LIP_F7_AL_PS       0                   TxLinkResets       0
  LIP_F7_F7          0                   TxOfflineSeq       0
  LIP_F8_AL_PS       0
```

Show Postlog

Displays the Power On Self Test (POST) log, which contains results from the most recently failed POST.

Authority None

Syntax **show postlog**

or

show port log

Examples The following is an example of the Show Postlog command:

```
SANbox #> show postlog

    Queue:              POST
    Sequence Count:     467
    Success Count:      452
    Failed Count:       42
    Records:            53

    Record:             1 of 53
    Time:               day mmm dd hh:mm:ss yyyy
    Sequence Number:    5
    Consecutive Passes: 5

    Record:             2 of 53
    Time:               day mmm dd hh:mm:ss yyyy
    Sequence Number:    6
    Test:               TEST_SUITE_POST (0x13)
    Subtest:            TEST_STATIC_PORTADDR (0x72)
    Fault Code:         DIAGS_ERR_CPORT_VERIFY (0x34)
    Loops:              0
    Blade/Asic:         0/0
    Register Address:   0x00000005
    Received Data:      0x0082202b
    Expected Data:      0x00a2202b
    .
    .
    .
```

Show Setup Callhome

Displays the Call Home database configuration.

Authority None

Syntax **show setup callhome**

Examples The following is an example of the Show Setup Callhome command:

```
SANbox #> show setup callhome
  Callhome Information
  --------------------
  PrimarySMTPServerAddr       0.0.0.0
  PrimarySMTPServerPort       25
  PrimarySMTPServerEnabled    False
  SecondarySMTPServerAddr     0.0.0.0
  SecondarySMTPServerPort     25
  SecondarySMTPServerEnabled  False
  ContactEmailAddress         nobody@localhost.localdomain
  PhoneNumber                 <undefined>
  StreetAddress               <undefined>
  FromEmailAddress            nobody@localhost.localdomain
  ReplyToEmailAddress         nobody@localhost.localdomain
  ThrottleDupsEnabled         True

  + indicates active SMTP server
```

Show Setup Mfg

Displays manufacturing information about the switch.

Authority None

Syntax **show setup mfg**

Examples The following is an example of the Show Setup Mfg command:

```
SANbox #> show setup mfg
  Manufacturing Information
  -------------------------
  BrandName                QLogic
  BuildDate                Unknown
  ChassisPartNumber        SANbox 5802V
  ChassisSerialNumber      0331000011
  CPUBoardSerialNumber     0331000011
  LicensedPorts            24
  MACAddress               00:c0:dd:02:cc:17
  PlanarPartNumber         Unknown
  SwitchSymbolicName       SANbox
  SwitchWWN                10:00:00:c0:dd:02:cc:16
  SystemDescription        SANbox 5802V FC Switch
  SystemObjectID           1.3.6.1.4.1.3873.1.9
```

Show Setup Radius

Displays RADIUS server information.

Authority None

Syntax **show setup radius**

common

server [server_number]

Keywords **common**

Displays the configuration parameters that are common for all RADIUS servers. To display common and server-specific information, omit the keyword. Refer to Table 14-26 for a description of the common configuration parameters.

server [server_number]

Displays the configuration parameters for the RADIUS server given by [server_number]. [server_number] is an integer corresponding to a configured server. To display common and server-specific information, omit the keyword. Refer to Table 14-27 for a description of the server-specific configuration parameters.

Examples The following is an example of the Show Setup Radius Common command:

```
SANbox #> show setup radius common
  Radius Information
  ------------------
  DeviceAuthOrder   Local
  UserAuthOrder     Local
  TotalServers      2
```

The following is an example of the Show Setup Radius Server command:

```
SANbox #> show setup radius server 2
  Radius Information
  ------------------
  Server: 2

  ServerIPAddress   bacd:1234:bacd:1234:bacd:1234:bacd:1234
  ServerUDPPort     1812
  DeviceAuthServer  True
  UserAuthServer    True
  AccountingServer  True
  Timeout           2
  Retries           0
  SignPackets       False
  Secret            ********
```

Show Setup Services

Displays switch service status information.

Authority None

Syntax **show setup services**

Examples The following is an example of the Show Setup Services command:

```
SANbox #> show setup services
System Services
----------------------------
TelnetEnabled             True
SSHEnabled                False
GUIMgmtEnabled            True
SSLEnabled                False
EmbeddedGUIEnabled        True
SNMPEnabled               True
NTPEnabled                True
CIMEnabled                True
FTPEnabled                True
MgmtServerEnabled         True
CallHomeEnabled           True
```

Show Setup Snmp

Displays the current SNMP settings.

Authority None

Syntax **show setup snmp**

common

trap

Keywords **common**

Displays SNMP configuration parameters that are common to all traps. To display common and trap-specific parameters, omit the keyword. Refer to Table 14-29 for descriptions of the common configuration parameters.

trap

Displays trap-specific SNMP configuration parameters. To display common and trap-specific parameters, omit the keyword. Refer to Table 14-30 for descriptions of the trap-specific configuration parameters.

Examples The following is an example of the Show Setup Snmp Common command:

```
SANbox #> show setup snmp common
  SNMP Information
  ----------------
  SNMPEnabled           True
  Contact               <sysContact undefined>
  Location              <sysLocation undefined>
  Description           SANbox 5802V FC Switch
  ObjectID              1.3.6.1.4.1.3873.1.9
  AuthFailureTrap       True
  ProxyEnabled          True
  SNMPv3Enabled         False
```

The following is an example of the Show Setup Snmp Trap command:

```
SANbox #> show setup snmp trap 1
  SNMP Information
  ----------------
  Trap1Address          10.0.0.254
  Trap1Port             162
  Trap1Severity         warning
  Trap1Version          2
  Trap1Enabled          False
```

Show Setup System

Displays network, logging, NTP server, and timer parameters on the switch.

Authority None

Syntax **show setup system**

dns
ipv4
ipv6
logging
ntp
timers

Keywords **dns**

Displays DNS host name configuration parameters. To display all system configuration parameters, omit the keyword. Refer to Table 14-31 for descriptions of the DNS host name configuration parameters.

ipv4

Displays switch IPv4 Ethernet configuration parameters. To display all system configuration parameters, omit the keyword. Refer to Table 14-32 for descriptions of the IPv4 Ethernet configuration parameters.

ipv6

Displays switch IP version 6 Ethernet configuration parameters. To display all system configuration parameters, omit the keyword. Refer to Table 14-33 for descriptions of the IP version 6 Ethernet configuration parameters.

logging

Displays event logging configuration parameters. To display all system configuration parameters, omit the keyword. Refer to Table 14-34 for descriptions of the event logging configuration parameters.

ntp

Displays NTP server configuration parameters. To display all system configuration parameters, omit the keyword. Refer to Table 14-35 for descriptions of the NTP server configuration parameters.

timers

Displays timer configuration parameters. To display all system configuration parameters, omit the keyword. Refer to Table 14-36 for descriptions of the timer configuration parameters.

Examples

The following is an example of the Show Setup System Dns command:

```
SANbox #> show setup system dns

System Information
  ------------------
  DNSClientEnabled        False
  DNSLocalHostname        <undefined>
  DNSServerDiscovery      Static
  DNSServer1Address       <undefined>
  DNSServer2Address       <undefined>
  DNSServer3Address       <undefined>
  DNSSearchListDiscovery  Static
  DNSSearchList1          <undefined>
  DNSSearchList2          <undefined>
  DNSSearchList3          <undefined>
  DNSSearchList4          <undefined>
  DNSSearchList5          <undefined>
```

The following is an example of the Show Setup System Ipv4 command:

```
SANbox #> show setup system ipv4

  System Information
  ------------------
  EthIPv4NetworkEnable         True
  EthIPv4NetworkDiscovery      Static
  EthIPv4NetworkAddress        10.20.11.32
  EthIPv4NetworkMask           255.255.252.0
  EthIPv4GatewayAddress        10.20.8.254
```

The following is an example of the Show Setup System Ipv6 command:

```
SANbox #> show setup system ipv6

  System Information
  ------------------
  EthIPv6NetworkEnable         False
  EthIPv6NetworkDiscovery      Static
  EthIPv6NetworkAddress        2001::1/64
  EthIPv6GatewayAddress        fe80::1
```

The following example of the Show Setup System Logging command:

```
SANbox #> show setup system logging

  System Information
  ------------------
  LocalLogEnabled          True
  RemoteLogEnabled         False
  RemoteLogHostAddress     10.0.0.254
```

The following is an example of the Show Setup System Ntp command:

```
SANbox #> show setup system

  System Information
  ------------------
  NTPClientEnabled         False
  NTPServerDiscovery       Static
  NTPServerAddress         51.68.85.102
```

The following example of the Show Setup System Timers command:

```
SANbox #> show setup system timers

  System Information
  ------------------
  AdminTimeout             30
  InactivityTimeout        0
```

Show Steering

Displays the routes that data takes in the fabric.

Authority None

Syntax **show steering *[domain_id]***

Keywords ***[domain_id]***
The domain ID for which to display route information. If you omit [domain_id], the system displays routes for all switches in the fabric.

Examples The following is an example of the Show Steering command:

```
SANbox #> show steering 35

  DomainID    DefaultOutPort    InPort OutPort
  --------    --------------    ------ -------
  35          18                3      16/18/16/18
                                5      18/16/18/16
                                6      16/18/16/18
                                7      16/18/16/18
                                15     18/16/18/16
```

Show Switch

Displays switch operational information.

Authority None

Syntax **show switch**

Notes Table 14-41 describes the switch operational parameters.

Table 14-41. Switch Operational Parameters

Parameter	Description
SymbolicName	Descriptive name for the switch
SwitchWWN	Switch worldwide name
BootVersion	PROM boot version
CreditPool	Number of port buffer credits available to recipient ports
DomainID	Switch domain ID
FirstPortAddress	Fibre Channel address of switch port 0
FlashSize - MBytes	Size of the flash memory in megabytes
LogFilterLevel	Event severity level used to record events in the event log
MaxPorts	Number of ports available on the switch
NumberOfResets	Number of times the switch has been reset over its service life
ReasonForLastReset	Action that caused the last reset
ActiveImageVersion - build date	Active firmware image version and build date.
PendingImageVersion - build date	Firmware image version and build date that is pending. This image will become active at the next reset or power cycle.
ActiveConfiguration	Name of the switch configuration that is in use.
AdminState	Switch administrative state
AdminModeActive	Admin session status
BeaconOnStatus	Beacon status as set by the Set Beacon command.
OperationalState	Switch operational state

Table 14-41. Switch Operational Parameters (Continued)

Parameter	Description
PrincipalSwitchRole	Principal switch status. True indicates that this switch is the principal switch.
POSTFaultCode	Fault code from the most recent Power-on self test
POSTStatus	Status from the most recent Power-on self test
TestFaultCode	Fault code from the most recent switch test
TestStatus	Status from the most recent switch test
BoardTemp (1) - Degrees Celsius	Internal switch temperature at circuit board sensor 1.
SwitchTemperatureStatus	Switch temperature status: Normal, Warning, Failure.

Examples

The following is an example of the Show Switch command:

```
SANbox #> show switch
 Switch Information
 ------------------
 SymbolicName                     SANbox
 SwitchWWN                        10:00:00:c0:dd:00:bc:56
 BootVersion                      Vx.x.x.x-0 (day month date time year)
 CreditPool                       0
 DomainID                         19 (0x13)
 FirstPortAddress                 130000
 FlashSize - MBytes               128
 LogFilterLevel                   Critical
 MaxPorts                         24
 NumberOfResets                   15
 ReasonForLastReset               PowerUp
 ActiveImageVersion - build date  Vx.x.x.0 (day month date time year)
 PendingImageVersion - build date Vx.x.x.0 (day month date time year)
 ActiveConfiguration              default
 AdminState                       Online
 AdminModeActive                  False
 BeaconOnStatus                   Off
 OperationalState                 Online
 PrincipalSwitchRole              False
 POSTFaultCode                    00000000
 POSTStatus                       Passed
 TestFaultCode                    00000000
 TestStatus                       NeverRun
 BoardTemp (1) - Degrees Celsius  32
 SwitchTemperatureStatus          Normal
```

Show System

Displays the operational status of the Ethernet and DNS host name configuration parameters.

Authority None

Syntax **show system**

Examples The following is an example of the Show System command:

```
SANbox #> show system

  Assigned System Network Information
  -----------------------------------
  Hostname               <undefined>
  EthIPv4NetworkAddress  10.20.116.133
  EthIPv6NetworkAddress  <undefined>
  DNSServer1             <undefined>
  DNSSearchList1         <undefined>
  IPv4GatewayList1       10.20.116.1
  IPv6GatewayList1       <undefined>
  NTPServer              10.20.10.10
```

Show Testlog

Displays the contents of the diagnostic field test log file.

Authority None

Syntax **show testlog**

or

show test log

Examples The following is an example of the Show Testlog command:

```
SANbox #> show testlog
    Queue:              UID
    Sequence Count:     676
    Success Count:      420
    Failed Count:       2023
    Records:            127

    Record:             1 of 127
    Time:               day mon dd hh:mm:ss yyyy
    Sequence Number:    211
    Test:               TEST_SUITE_BLADE_OFFLINE (0x12)
    Subtest:            TEST_FLOW_TC (0x97)
    Fault Code:         DIAGS_ERR_DATA_VERIFY (0x1e)
    Loops:              1
    Blade/Asic/Port:    0/0/0

    Record:             2 of 127
    Time:               day mon dd hh:mm:ss yyyy
    Sequence Number:    211
    Test:               TEST_SUITE_BLADE_OFFLINE (0x12)
    Subtest:            TEST_FLOW_TC (0x97)
    Fault Code:         DIAGS_ERR_DATA_VERIFY (0x1e)
    Loops:              1
    Blade/Asic/Port:    0/0/0
    .
    .
    .
```

Show Timezone

Displays the current time zone setting.

Authority None

Syntax **show timezone**

Examples The following is an example of the Show Timezone command:

```
SANbox #> show timezone

  America/Chicago
```

Show Topology

Displays information about devices connected to the switch.

Authority None

Syntax **show topology *[port_number]***

Keywords **[port_number]**

Displays the devices connected to the port given by [port_number].

Examples The following is an example of the Show Topology command:

```
SANbox #> show topology
Unique ID Key
-------------
A = ALPA,  D = Domain ID,  P = Port ID
Port   Local Local                    Remote  Remote                    Unique
Number Type  PortWWN                  Type    NodeWWN                   ID
------ ----- -------                  ------  -------                   ------
5      F     20:05:00:c0:dd:00:bd:ec   N      20:00:00:00:c9:22:1e:93   010500 P
10     E     20:0a:00:c0:dd:00:bd:ec   E      10:00:00:c0:dd:00:80:21   4(0x4) D
```

The following is an example of the Show Topology command for port 1:

```
SANbox  #> show topology 1
  Local Link Information
  ----------------------
  PortNumber             1
  PortID                 650100
  PortWWN                20:01:00:c0:dd:00:91:11
  PortType               F

  Remote Link Information
  -----------------------
  Device                 0
  NodeWWN                50:80:02:00:00:06:d5:38
  PortType               NL
  Description            (NULL)
  IPv4Address            0.0.0.0
  IPv6Address            fc00:1234:5678:9abc:def0:1234:5678:9abc

  Device                 1
  NodeWWN                20:00:00:20:37:2b:08:c9
  PortType               NL
  Description            (NULL)
  IPv4Address            0.0.0.0
  IPv6Address            fc00:1234:5678:9abc:def0:1234:5678:9efg
```

Show Users

Displays a list of logged-in users. This is equivalent to the User List command.

Authority None

Syntax **show users *brief***

Keywords **brief**

Displays just the account name and client.

Examples The following is an example of the Show Users command:

```
SANbox #> show users
  User             cim@OB-session1
  Client           cim
  Logged in Since  Tue Apr  8 05:22:47 2008

  User             snmp@IB-session2
  Client           Unknown
  Logged in Since  Tue Apr  8 05:22:55 2008

  User             snmp@OB-session3
  Client           Unknown
  Logged in Since  Tue Apr  8 05:22:55 2008

  User             admin@OB-session5
  Client           10.33.21.27
  Logged in Since  Thu Apr 10 04:14:11 2008
```

The following is an example of the Show Users Brief command:

```
SANbox #> show users brief
  User                          Client
  ----                          ------
  cim@OB-session1               cim
  snmp@IB-session2              Unknown
  snmp@OB-session3              Unknown
  admin@OB-session5             10.33.21.27
```

Show Version

Displays an introductory set of information about operational attributes of the switch. This command is equivalent to the Show About command.

Authority None

Syntax **show version**

Notes Table 14-42 describes the Show Version command display entries.

Table 14-42. Show Version Display Entries

Entry	Description
SystemDescription	Switch system description
HostName	DNS host name
EthIPv4NetworkAddress	Switch IP address, version 4
EthIPv6NetworkAddress	Switch IP address, version 6
MacAddress	Switch MAC address
WorldWideName	Switch worldwide name
ChassisSerialNumber	Switch serial number
SymbolicName	Switch symbolic name
ActiveSWVersion	Firmware version
ActiveTimestamp	Date and time that the firmware was activated
POSTStatus	Results of the Power-on Self Test
LicensedPorts	Number of licensed ports
SwitchMode	Full Fabric indicates that the switch operates with the standard Fibre Channel port types: G, GL, F, FL, E.

Examples

The following is an example of the Show Version command.

```
SANbox #> show version
       ************************************************
       *                                              *
       *       Command Line Interface SHell  (CLISH)  *
       *                                              *
       ************************************************

       SystemDescription         SANbox 5802V FC Switch
       HostName                  <undefined>
       EthIPv4NetworkAddress     10.20.11.192
       EthIPv6NetworkAddress     ::
       MACAddress                00:c0:dd:00:71:ee
       WorldWideName             10:00:00:c0:dd:00:71:ed
       ChassisSerialNumber       033100024
       SymbolicName              SANbox
       ActiveSWVersion           V7.4.x.x.xx.xx
       ActiveTimestamp           day month date time year
       POSTStatus                Passed
       LicensedPorts             24
       SwitchMode                Full Fabric
```

Shutdown

Terminates all data transfers on the switch at convenient points and closes the Telnet session. Always power cycle the switch after entering this command.

Authority Admin session

Syntax **shutdown**

Notes When the shutdown is complete, the Heartbeat LED is extinguished.

Snmpv3user

Manages SNMP version 3 user accounts on the switch.

Authority Admin session except for the List keyword

Syntax **snmpv3user**

add
delete [account]
edit
list

Keywords **add**

Creates an SNMP version 3 user account, prompting you for the parameters that are described in Table 14-43.

Table 14-43. SNMP Version 3 User Account Parameters

Parameter	Description
Username	Account user name
Group	Group type: Read-Only or Read-Write. The default is Read-Only.
Authentication	Enables (True) or disables (False) authentication. The default is False.
AuthType	Authentication type can be MD5 or SHA.
AuthPhrase	Authentication phrase
Confirm AuthPhrase	Authentication phrase confirmation. Re-enter the phrase.
Privacy	Enables (True) or disables (False) privacy. The default is False.
PrivType	Privacy type. The default is DES.
PrivPhrase	Privacy phrase
Confirm PrivPhrase	Privacy phrase confirmation. Re-enter the phrase.

delete [account]

Deletes the SNMP version 3 user account given by [account].

edit

Modifies an SNMP version 3 user account, prompting you first for the account name to edit. For a description of the SNMP version 3 user account parameters, refer to Table 14-43.

list

Displays SNMP version 3 user accounts, group, authentication type, and privacy type. This keyword does not require an Admin session.

Examples

The following is an example of the Snmpv3user Add command:

```
SANbox #> admin start
SANbox (admin) #> snmpv3user add

     A list of SNMPV3 user attributes with formatting and default values as
     applicable will follow.

     Enter a new value OR simply press the ENTER key where-ever allowed to
     accept the default value.

     If you wish to terminate this process before reaching the end of the list,
     press "q" or "Q" and the ENTER OR "Ctrl-C" key to do so.

  Username        (8-32 chars)                          : snmpuser1
  Group           (0=ReadOnly, 1=ReadWrite) [ReadOnly  ] : 1
  Authentication  (True/False)              [False     ] : t
  AuthType        (1=MD5, 2=SHA)            [MD5       ] : 1
  AuthPhrase      (8-32 chars)                          : ***********
  Confirm AuthPhrase                                    : ***********
  Privacy         (True/False)              [False     ] : t
  PrivType        (1=DES)                   [DES       ] : 1
  PrivPhrase      (8-32 chars)                          : ********
  Confirm PrivPhrase                                    : ********

  Do you want to save and activate this snmpv3user setup ?   (y/n): [n] y

  SNMPV3 user added and activated.
```

The following is an example of the Snmpv3user Delete command:

```
SANbox #> admin start
SANbox (admin) #> snmpv3user delete snmpuser1

  The user account will be deleted. Please confirm (y/n): [n] y
  SNMPV3 user deleted.
```

The following is an example of the Snmpv3user List command:

```
SANbox #> snmpv3user list

  Username                          Group           AuthType   PrivType
  --------                          -----           --------   --------
  snmpuser1                         ReadWrite       MD5        DES
```

Test Cancel

Cancels a port test that is in progress.

Authority Admin session

Syntax **test cancel**
port [port_number]

Keywords **port [port_number]**
Cancel the test for the port given by [port_number]. [port_number] can be 0–23.

Examples The following example cancels the test running on port 15:

```
SANbox (admin) #> test cancel port 15
```

Test Port

Tests individual ports using an offline or online test.

Authority Admin session

Syntax **test port [port_number]**
offline [loopback_type]
online

Keywords **[port_number]**

The port to be tested. [port_number] can be 0–23.

offline [loopback_type]

Performs an offline test of the type given by [loopback_type] on the port given by [port_number]. Use the Set Port command to place the port in the diagnostics state before running the test. [loopback_type] can have the following values:

internal

Exercises the internal port connections.

NOTE:

An internal test on an XPAK port verifies that a complete path exists, but does not send a test frame.

external

Exercises the port and its transceiver. A transceiver with a loopback plug is required for the port.

NOTE:

An external test on an XPAK port verifies that a complete path exists, but does not send a test frame.

online

Exercises the port, transceiver, and device connections while the port is online. This test does not disrupt communication on the port.

Notes

Table 14-44 describes the port test parameters.

Table 14-44. Port Test Parameters

Parameter	Description
LoopCount	Number of frames sent
FrameSize	Number of bytes in each test frame
DataPattern	Pattern in the payload
StopOnError	Stops the test when an error occurs (True). Otherwise, the test continues to completion.
LoopForever	Restarts the test after completion and continues until you cancel it (True). Otherwise, the test ends normally after completion.

To cancel a port test that is in progress, enter the Test Cancel Port command.

To display the status of the most recent port test or port test in progress, enter the Test Status Port command.

Examples

The following example performs an online test on port 1:

```
SANbox #> admin start
SANbox (admin) #> test port 1 online

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the default value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.

LoopCount     (decimal value, 1-4294967295)   [429496729]
FrameSize     (decimal value, 40-2148)        [256      ]
DataPattern   (32-bit hex value or 'Default') [Default  ]
StopOnError   (True / False)                  [True     ]
LoopForever   (True / False)                  [False    ]

Do you want to start the test? (y/n) [n] y

The test has been started.
A notification with the test result(s) will appear
on the screen when the test has completed.

SANbox (admin) #>
  Test for port 1 Passed.
```

Test Status

Displays the status of a test in progress, or if there is no test in progress, the status of the last test that was executed.

Authority None

Syntax **test status**

port [port_number]

switch

Keywords **port [port_number]**

Display test status for the port given by [port_number]. [port_number] can be 0–23.

switch

Display test status for the switch: Passed, Failed, NeverRun.

Examples The following is an example of the Test Status Port command:

```
SANbox (admin) #> test status port 1
Port              Test                Test               Loop      Test
Num      Port     Type                Status            Count  Failures
----     -------- ----                ------            -----  --------
1        1        Offline Internal    Passed               12         0
```

The following example of the Test Status Switch command:

```
SANbox (admin) #> test status switch

Blade    Test                 Test                 Loop     Test
ID       Type                 Status              Count Failures
-----    ----                 ------              ----- --------
IO0      Offline internal     StoppedOnError         12        2
IO1      Offline internal     NeverRun                1        0
IO2      Offline internal     Passed                  4        0
IO3      Offline internal     NeverRun                1        0
IO4      Offline internal     NeverRun                1        0
IO5      Offline internal     NeverRun                1        0
IO6      Offline internal     NeverRun                1        0
IO7      Offline internal     StoppedOnError         12        2
CPU0     Offline internal     NeverRun                1        0
CPU1     Offline internal     NeverRun                1        0
```

Test Switch

Tests all ports on the switch using a connectivity test, an offline test, or an online test.

Authority Admin session

Syntax **test switch**

connectivity [loopback_type]

offline [loopback_type]

online

Keywords **connectivity [loopback_type]**

Performs a connectivity test of the type given by [loopback_type] on all switch ports. You must place the switch in the diagnostics state using the Set Switch State command before starting the test. [loopback_type] can be one of the following:

internal

Exercises all internal port and inter-port connections.

external

Exercises all internal port, transceiver, and inter-port connections. A transceiver with a loopback plug is required for all ports.

offline [loopback_type]

Performs an offline test of the type given by [loopback_type] on all switch ports. You must place the switch in the diagnostics state using the Set Switch State command before starting the test. [loopback_type] can have the following values:

internal

Exercises all internal port connections.

external

Exercises all port and transceiver connections. A transceiver with a loopback plug is required for all ports.

online

Exercises port-to-device connections for all ports that are online. This test does not disrupt communication on the ports.

Notes

Table 14-45 describes the switch test parameters.

Table 14-45. Switch Test Parameters

Parameter	Description
LoopCount	Number of frames sent: 1–4294967295. The default is 100.
FrameSize	Number of bytes in each test frame: 40–2148. The default is 256.
DataPattern	32-bit hexadecimal test value, or default, which defines random data
StopOnError	Stops the test when an error occurs (True). Otherwise, the test continues to completion.
LoopForever	Restarts the test after completion and continues until you cancel it (True). Otherwise, the test ends normally after completion.

To cancel a switch test in progress, enter the Test Cancel Switch command.

To display the status of a recent switch test or switch test in progress, enter the Test Status Switch command.

Examples

The following example performs an offline internal test on a switch:

```
SANbox #> admin start
SANbox (admin) #>set switch state diagnostics
SANbox (admin) #> test switch offline internal

A list of attributes with formatting and current values will follow. Enter a new
value or simply press the ENTER key to accept the default value. If you wish to
terminate this process before reaching the end of the list press 'q' or 'Q' and the
ENTER key to do so.

LoopCount     (decimal value, 1-4294967295)   [100    ]
FrameSize     (decimal value, 40-2148)        [256    ]
DataPattern   (32-bit hex value or 'Default') [Default]
StopOnError   (True / False)                  [True   ]
LoopForever   (True / False)                  [False  ]

Do you want to start the test? (y/n) [n] y
```

Uptime

Displays the elapsed up time since the switch was last reset and the reset method. A hot reset or non-disruptive firmware activation does not reset the elapsed up time reported by this command.

Authority None

Syntax **uptime**

Examples The following is an example of the Uptime command:

```
SANbox #> uptime

  Elapsed up time  : 0 day(s), 2 hour(s), 28 min(s), 44 sec(s)
  Reason last reset: NormalReset
```

User

Administers and displays user accounts.

Authority Admin account name and an Admin session. The Accounts and List keywords are available to all account names without an Admin session.

Syntax

user
accounts
add
delete [account_name]
edit
list *brief*

Keywords

accounts

Displays all user accounts that exist on the switch. This keyword is available to all account names without an Admin session.

add

Add a user account to the switch. You will be prompted for an account name, a password, authority, and an expiration date.

- A switch can have a maximum of 15 user accounts. An account name can be up to 15 characters: the first character must be alphanumeric; the remaining characters must be ASCII characters excluding semicolon (;), comma (,), #, and period (.).
- Passwords must be 8–20 characters.
- Admin authority grants permission to use the Admin command to open an Admin session, from which all commands can be entered. Without Admin authority, you are limited to view-only commands.
- The expiration date is expressed in the number of days until the account expires (2000 maximum). The switch will issue an expiration alarm every day for seven days prior to expiration. 0 (zero) specifies that the account has no expiration date.

delete [account_name]

Deletes the account name given by [account_name] from the switch.

edit

Initiates an edit session that prompts you for the account name for which to change the expiration date and authority.

list *brief*

Displays the list of users currently logged in, the login date, and the login time. The User List command is equivalent to the Show Users command. This keyword is available to all account names without an Admin session. To display just the account name and client, enter the User List Brief command.

Notes

Authority level or password changes that you make to an account that is currently logged in do not take effect until that account logs in again.

Examples

The following is an example of the User Accounts command:

```
SANbox (admin) #> user accounts

    Current list of user accounts
  ----------------------------
  images       (admin authority = False, never expires)
  admin        (admin authority = True , never expires)
  chuckca      (admin authority = False, expires in < 50 days)
  gregj        (admin authority = True , expires in < 100 days)
  fred         (admin authority = True , never expires)
```

The following is an example of the User Add command:

```
SANbox (admin) #> user add
Press 'q' and the ENTER key to abort this command.
account name (1-15 chars)      : user1
account password (8-20 chars)  : *******

please confirm account password: *******

set account expiration in days (0-2000, 0=never): [0] 100

should this account have admin authority? (y/n): [n] y

OK to add user account 'user1' with admin authority
and to expire in 100 days?

Please confirm (y/n): [n] y
```

The following is an example of the User Edit command:

```
SANbox (admin) #> user edit

      Press 'q' and the ENTER key to abort this command.

  account name (1-15 chars)      : user1
  set account expiration in days (0-2000, 0=never): [0]
  should this account have admin authority? (y/n): [n]

  OK to modify user account 'user1' with no admin authority
  and to expire in 0 days?

  Please confirm (y/n): [n]
```

The following is an example of the User Delete command:

```
SANbox (admin) #> user del user3

  The user account will be deleted.  Please confirm (y/n): [n] y
```

The following is an example of the User List command:

```
SANbox (admin) #> user list

  User             cim@OB-session1
  Client           cim
  Logged in Since  day month date time year

  User             snmp@IB-session2
  Client           Unknown
  Logged in Since  day month date time year

  User             snmp@OB-session3
  Client           Unknown
  Logged in Since  day month date time year

  User             admin@OB-session8
  Client           10.33.21.27
  Logged in Since  day month date time year
```

Whoami

Displays the account name, session number, and switch domain ID for the Telnet session.

Authority None

Syntax **whoami**

Examples The following is an example of the Whoami command:

```
SANbox #> whoami

User name       : admin@session2
Switch name     : SANbox
Switch domain ID: 21 (0x15)
```

Zone

Manages zones and zone membership on a switch.

Authority Admin session and a Zoning Edit session. Refer to the "Zoning Edit" command on page 14-216 for information about starting a Zoning Edit session. The List, Members, and Zonesets keywords are available without an Admin session.

Syntax

zone

add [zone] [member_list]
list
members [zone]
orphans
remove [zone] [member_list]
rename [zone_old] [zone_new]
zonesets [zone]

Keywords

add [zone] [member_list]

Specifies one or more ports/devices given by [members] to add to the zone named [zone]. Use a <space> to delimit aliases and ports/devices in [member_list]. A zone can have a maximum of 2000 members. [member_list] can have any of the following formats:

- Domain ID and port number pair (Domain ID, Port Number). Domain IDs can be 1–239; port numbers can be 0–255.
- 6-character hexadecimal device Fibre Channel address (hex)
- 16-character hexadecimal worldwide port name (WWPN) with the format xx:xx:xx:xx:xx:xx:xx:xx.
- Alias name

The application verifies that the [members] format is correct, but does not validate that such a member exists. You must enter the Zoning Save command afterwards to save your changes.

copy [zone_source] [zone_destination]

Creates a new zone named [zone_destination] and copies the membership into it from the zone given by [zone_source]. You must enter the Zoning Save command afterwards to save your changes.

create [zone]

Creates a zone with the name given by [zone]. An zone name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The zoning database supports a maximum of 2000 zones. You must enter the Zoning Save command afterwards to save your changes.

delete [zone]

Deletes the specified zone given by [zone] from the zoning database. If the zone is a component of the active zone set, the zone will not be removed from the active zone set until the active zone set is deactivated. You must enter the Zoning Save command afterwards to save your changes.

list

Displays a list of all zones and the zone sets of which they are components. This keyword does not require an Admin session.

members [zone]

Displays all members of the zone given by [zone]. This keyword does not require an Admin session.

orphans

Displays a list of zones that are not members of any zone set.

remove [zone] [member_list]

Removes the ports/devices given by [member_list] from the zone given by [zone]. Use a <space> to delimit aliases and ports/devices in [member_list]. [member_list] can have any of the following formats:

- Domain ID and port number pair (Domain ID, Port Number). Domain IDs can be 1–239; port numbers can be 0–255.
- 6-character hexadecimal device Fibre Channel address (hex)
- 16-character hexadecimal worldwide port name (WWPN) with the format xx:xx:xx:xx:xx:xx:xx:xx.
- Alias name

You must enter the Zoning Save command afterwards to save your changes.

rename [zone_old] [zone_new]

Renames the zone given by [zone_old] to the zone given by [zone_new]. You must enter the Zoning Save command afterwards to save your changes.

zonesets [zone]

Displays all zone sets of which the zone given by [zone] is a component. This keyword does not require an Admin session.

Examples

The following is an example of the Zone List command:

```
SANbox #> zone list

  Zone        ZoneSet
  ----        -------
  wwn_b0241f
              zone_set_1

  wwn_23bd31
              zone_set_1

  wwn_221416
              zone_set_2

  wwn_2215c3
              zone_set_2

  wwn_0160ed
              zone_set_3
```

The following is an example of the Zone Members command:

```
SANbox #> zone members wwn_b0241f

  Current List of Members for Zone: wwn_b0241f
  --------------------------------
  50:06:04:82:bf:d2:18:c2
  50:06:04:82:bf:d2:18:d2
  21:00:00:e0:8b:02:41:2f
```

The following is an example of the Zone Orphans command:

```
SANbox #> zone orphans
Current list of orphan zones
----------------------------
zone3
zone4
```

The following is an example of the Zone Zonesets command:

```
SANbox #> zone zonesets zone1

  Current List of ZoneSets for Zone: zone1
  --------------------------------
  zone_set_1
```

Zoneset

Manages zone sets and component zones across the fabric.

Authority Admin session and a Zoning Edit session. Refer to the "Zoning Edit" command on page 14-216 for information about starting a Zoning Edit session. The Active, List, and Zones keywords are available without an Admin session. You must close the Zoning Edit session before using the Activate and Deactivate keywords.

Syntax

zoneset

activate [zone_set]
active
add [zone_set] [zone_list]
copy [zone_set_source] [zone_set_destination]
create [zone_set]
deactivate
delete [zone_set]
list
remove [zone_set] [zone_list]
rename [zone_set_old] [zone_set_new]
zones [zone_set]

Keywords

activate [zone_set]

Activates the zone set given by [zone_set]. This keyword deactivates the active zone set. Close the Zoning Edit session before using this keyword.

active

Displays the name of the active zone set. This keyword does not require Admin session.

add [zone_set] [zone_list]

Adds a list of zones and aliases given by [zone_list] to the zone set given by [zone_set]. Use a <space> to delimit zone and alias names in [zone_list]. You must enter the Zoning Save command afterwards to save your changes.

copy [zone_set_source] [zone_set_destination]

Creates a new zone set named [zone_set_destination] and copies into it the zones from the zone set given by [zone_set_source]. You must enter the Zoning Save command afterwards to save your changes.

create [zone_set]

Creates the zone set with the name given by [zone_set]. A zone set name must begin with a letter and be no longer than 64 characters. Valid characters are 0-9, A-Z, a-z, _, $, ^, and -. The zoning database supports a maximum of 256 zone sets. You must enter the Zoning Save command afterwards to save your changes.

deactivate

Deactivates the active zone set. Close the Zoning Edit session before using this keyword.

delete [zone_set]

Deletes the zone set given by [zone_set]. If the specified zone set is active, the command is suspended until the zone set is deactivated. You must enter the Zoning Save command afterwards to save your changes.

list

Displays a list of all zone sets. This keyword does not require an Admin session.

remove [zone_set] [zone_list]

Removes a list of zones given by [zone_list] from the zone set given by [zone_set]. Use a <space> to delimit zone names in [zone_list]. If [zone_set] is the active zone set, the zone will not be removed until the zone set has been deactivated. You must enter the Zoning Save command afterwards to save your changes.

rename [zone_set_old] [zone_set_new]

Renames the zone set given by [zone_set_old] to the name given by [zone_set_new]. You can rename the active zone set. You must enter the Zoning Save command afterwards to save your changes.

zones [zone_set]

Displays all zones that are components of the zone set given by [zone_set]. This keyword does not require an Admin session.

Notes

- A zone set must be active for its definitions to be applied to the fabric.
- Only one zone set can be active at one time.
- A zone can be a component of more than one zone set.

Examples

The following is an example of the Zoneset Active command:

```
SANbox #> zoneset active

  Active ZoneSet Information
  --------------------------
  ActiveZoneSet    Bets
  LastActivatedBy  admin@OB-session6
  LastActivatedOn  day month date time year
```

The following is an example of the Zoneset List command:

```
SANbox #> zoneset list

  Current List of ZoneSets
  ------------------------
  alpha
  beta
```

The following is an example of the Zoneset Zones command:

```
SANbox #> zoneset zones ssss

  Current List of Zones for ZoneSet: ssss
  ---------------------------------
  zone1
  zone2
  zone3
```

Zoning Active

Displays information for the active zone set or saves the active zone set to the non-volatile zoning database.

Authority Admin session for the Capture keyword.

Syntax **zoning active**

capture

Keywords ***capture***

Saves the active zone set to the non-volatile zoning data base.

Examples The following is an example of the Zoning Active command:

```
SANbox #> zoning active
Active (enforced) ZoneSet Information
  ZoneSet     Zone      ZoneMember
  -------------------------------
  wwn
              wwn_b0241f
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        21:00:00:e0:8b:02:41:2f
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:c3
```

The following is an example of the Zoning Active Capture command:

```
SANbox (admin) #> zoning active capture
  This command will overwrite the configured zoning database in NVRAM.
  Please confirm (y/n): [n] y

  The active zoning database has been saved.
```

Zoning Cancel

Closes the current Zoning Edit session. Any unsaved changes are lost.

Authority Admin session and a Zoning Edit session.

Syntax **zoning cancel**

Examples The following is an example of the Zoning Cancel command:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
.
.
.
SANbox (admin-zoning) #> zoning cancel
  Zoning edit mode will be canceled.  Please confirm (y/n): [n] y
```

Zoning Clear

Clears all inactive zone sets from the volatile edit copy of the zoning database. This keyword requires a zoning edit session. This keyword does not affect the non-volatile zoning database. However, if you enter the Zoning Clear command followed by the Zoning Save command, the non-volatile zoning database will be cleared from the switch.

NOTE:

The preferred method for clearing the zoning database from the switch is the Reset Zoning command.

Authority Admin session and a Zoning Edit session.

Syntax **zoning clear**

Examples The following is an example of the Zoning Clear command:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #> zoning clear
SANbox (admin-zoning) #> zoning save
```

Zoning Configured

Displays the contents of the non-volatile zoning database.

Authority None

Syntax **zoning configured**

Examples The following is an example of the Zoning Configured command:

```
SANbox #> zoning configured

  Configured (saved in NVRAM) Zoning Information
  ZoneSet     Zone      ZoneMember
  -------     ----      ----------
  wwn
              wwn_b0241f
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:16
```

Zoning Delete Orphans

Deletes all objects that are not part of the active zone set, including zone sets, zones, and aliases.

Authority Admin session

Syntax **zoning delete orphans**

Examples The following is an example of the Zoning Delete Orphans command:

```
SANbox #> admin start
SANbox (admin) #> zoning delete orphans
   This command will remove all zonesets, zones, and aliases
   that are not currently active.
Please confirm (y/n): [n] y
SANbox (admin) #> zoning save
```

Zoning Edit

Opens a Zoning Edit session for the non-volatile zoning database or the merged zone set in which to create and manage zone sets and zones. Refer to the "Zone" command on page 14-205 and the "Zoneset" command on page 14-208.

Authority Admin session

Syntax **zoning edit *[database]***

Keywords ***[database]***

Opens an edit session for the zoning database given by [database]. If you omit [database], an edit session for the non-volatile zoning database is opened. [database] can have the following values:

configured
Opens a zoning edit session for the non-volatile zoning database.

merged
Opens a zoning edit session for the temporary merged zone set received from another switch.

Examples The following is an example of the Zoning Edit command:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #>
.
.
SANbox (admin-zoning) #> zoning save
  The changes have been saved; however, they must be activated
   before they can take effect -- see zoneset activate command.
```

Zoning Edited

Displays the contents of the edited zoning database.

Authority Admin session and a Zoning Edit session

Syntax **zoning edited**

Examples The following is an example of the Zoning Edited command:

```
SANbox (admin-zoning) #> zoning edited
Edited (unsaved) Zoning Information
ZoneSet         Zone            ZoneMember
-------         ----            ----------
ZS1
                Z1
                                10:00:00:c0:dd:00:b9:f9
                                10:00:00:c0:dd:00:b9:fa
```

Zoning History

Displays a history of zoning modifications. This keyword does not require an Admin session. History information includes the following:

- Time of the most recent zone set activation or deactivation and the user who performed it
- Time of the most recent modifications to the zoning database and the user who made them.
- Checksum for the zoning database

Authority None

Syntax **zoning history**

Examples The following is an example of the Zoning History command:

```
SANbox #> zoning history
  Active Database Information
  ---------------------------
  ZoneSetLastActivated/DeactivatedBy  Remote
  ZoneSetLastActivated/DeactivatedOn  day mon date hh:mm:ss yyyy
  Database Checksum                   00000000

  Inactive Database Information
  -----------------------------
  ConfigurationLastEditedBy           admin@OB-session17
  ConfigurationLastEditedOn           day mon date hh:mm:ss yyyy
  Database Checksum                   00000000
```

Zoning Limits

Displays the limits and numbers of zone sets, zones, aliases, members per zone, members per alias, and total members in the zoning database.

Authority None

Syntax **zoning limits**
brief

Keywords ***brief***

Displays zoning limits for each category, the current number of objects, and the applicable zoning database (non-volatile or active). If you omit this keyword, the display includes a membership breakdown for each zone.

Notes The specific zoning database limits are described in Table 14-46.

Table 14-46. Zoning Database Limits

Limit	Description
MaxZoneSets	Maximum number of zone sets (256)
MaxZones	Maximum number of zones (2000)
MaxAliases	Maximum number of aliases (2500)
MaxTotalMembers	Maximum number of zone and alias members (10000) that can be stored in the switch's zoning database. Each instance of a zone member or alias member counts toward this maximum.
MaxZonesInZoneSets	Maximum number of zones that are components of zone sets (2000), excluding those in the orphan zone set, that can be stored in the switch's zoning database. Each instance of a zone in a zone set counts toward this maximum.
MaxMembersPerZone	Maximum number of members in a zone (2000)
MaxMembersPerAlias	Maximum number of members in an alias (2000)

Zoning List

Lists all zoning definitions, including the applicable zoning database.

Authority None

Syntax **zoning list**

Examples The following is an example of the Zoning List command:

```
SANbox #> zoning list

  Active (enforced) ZoneSet Information
  ZoneSet     Zone      ZoneMember
  -------------------------------
  wwn
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:c3

  Configured (saved in NVRAM) Zoning Information
  ZoneSet     Zone      ZoneMember
  -------------------------------
  wwn
              wwn_23bd31
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:23:bd:31
              wwn_221416
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:14:16
              wwn_2215c3
                        50:06:04:82:bf:d2:18:c2
                        50:06:04:82:bf:d2:18:d2
                        10:00:00:00:c9:22:15:16
```

Zoning Merged

Displays the contents of the merged zone set, or saves the merged zone set to the non-volatile zoning database.

Authority Admin session for the Capture keyword.

Syntax **zoning merged**

capture

Keywords ***capture***

Saves the merged zone set to the non-volatile zoning database. You must enter the Zoning Save command afterwards to save your changes. If you omit this keyword, this command displays the contents of the merged zone set.

Examples The following is an example of the Zoning Merged command:

```
SANbox #> zoning merged
**********************************************************************
To permanently save the merged database locally, execute the
'zoning merged capture' command. To edit the merged database
use the ’zoning edit merged’ command. To remove the merged database
use the ’zoning restore’ command.
**********************************************************************
Merged (unsaved) Zoning Information
ZoneSet         Zone            ZoneMember
-------         ----            ----------
ZS1
                Z1
                                10:00:00:c0:dd:00:b9:f9
                                10:00:00:c0:dd:00:b9:fa
                Z2
                                10:00:00:c0:dd:00:b9:fb
                                10:00:00:c0:dd:00:b9:fc
```

The following is an example of the Zoning Merged Capture command:

```
SANbox (admin) #> zoning merged capture
  This command will overwrite the configured zoning database in NVRAM.
  Please confirm (y/n): [n] y

  The merged zoning database has been saved.
```

Zoning Restore

Restores the volatile zoning database with the contents of the non-volatile zoning database. If the MergeAutoSave parameter is False (see Table 14-13), you can use this command to revert changes to the merged zone set that were propagated from another switch in the fabric through zone set activation or merging fabrics.

Authority Admin session

Syntax **zoning restore**

Zoning Save

Saves changes made during the current Zoning Edit session. The system informs you that the zone set must be activated to implement any changes.

Authority Admin session and a Zoning Edit session.

Syntax **zoning save**

Examples The following is an example of the Zoning Save command:

```
SANbox #> admin start
SANbox (admin) #> zoning edit
SANbox (admin-zoning) #>
.
.
SANbox (admin-zoning) #> zoning save
  The changes have been saved; however, they must be activated
   before they can take effect -- see zoneset activate command.
```

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